

HP

MARCH 1994

Professional

- MIDDLEWARE: HERE, THERE, EVERYWHERE
- TAKING THE HP-UX HELM
- NETWARE SIGHTED ON PA-RISC HORIZON



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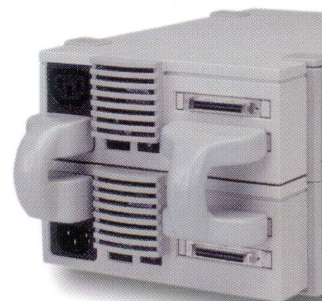
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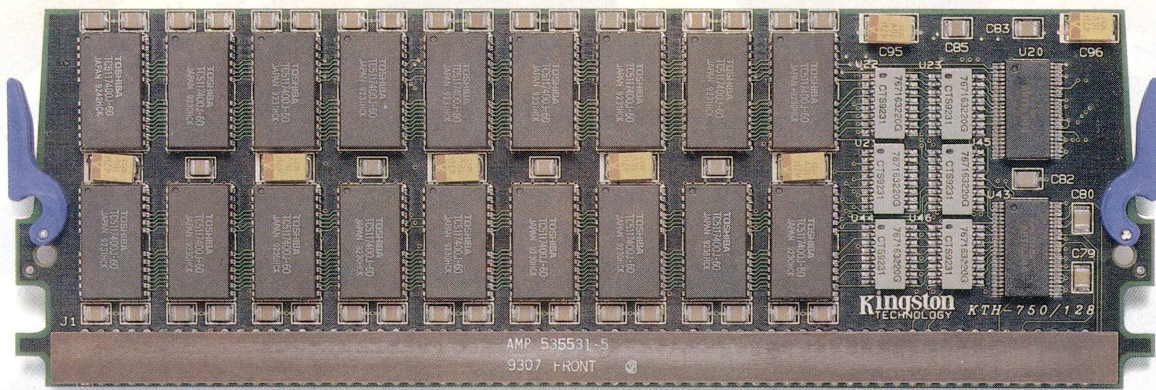


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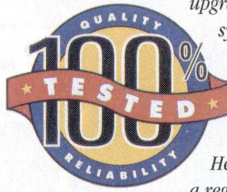


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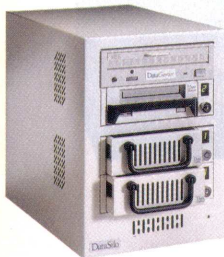
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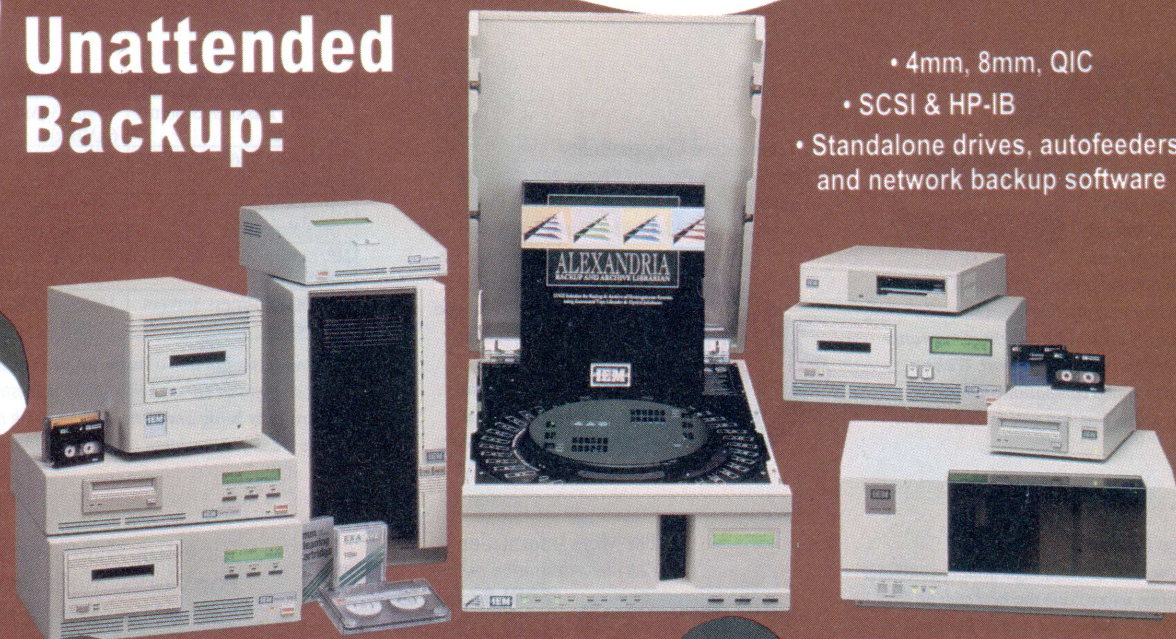
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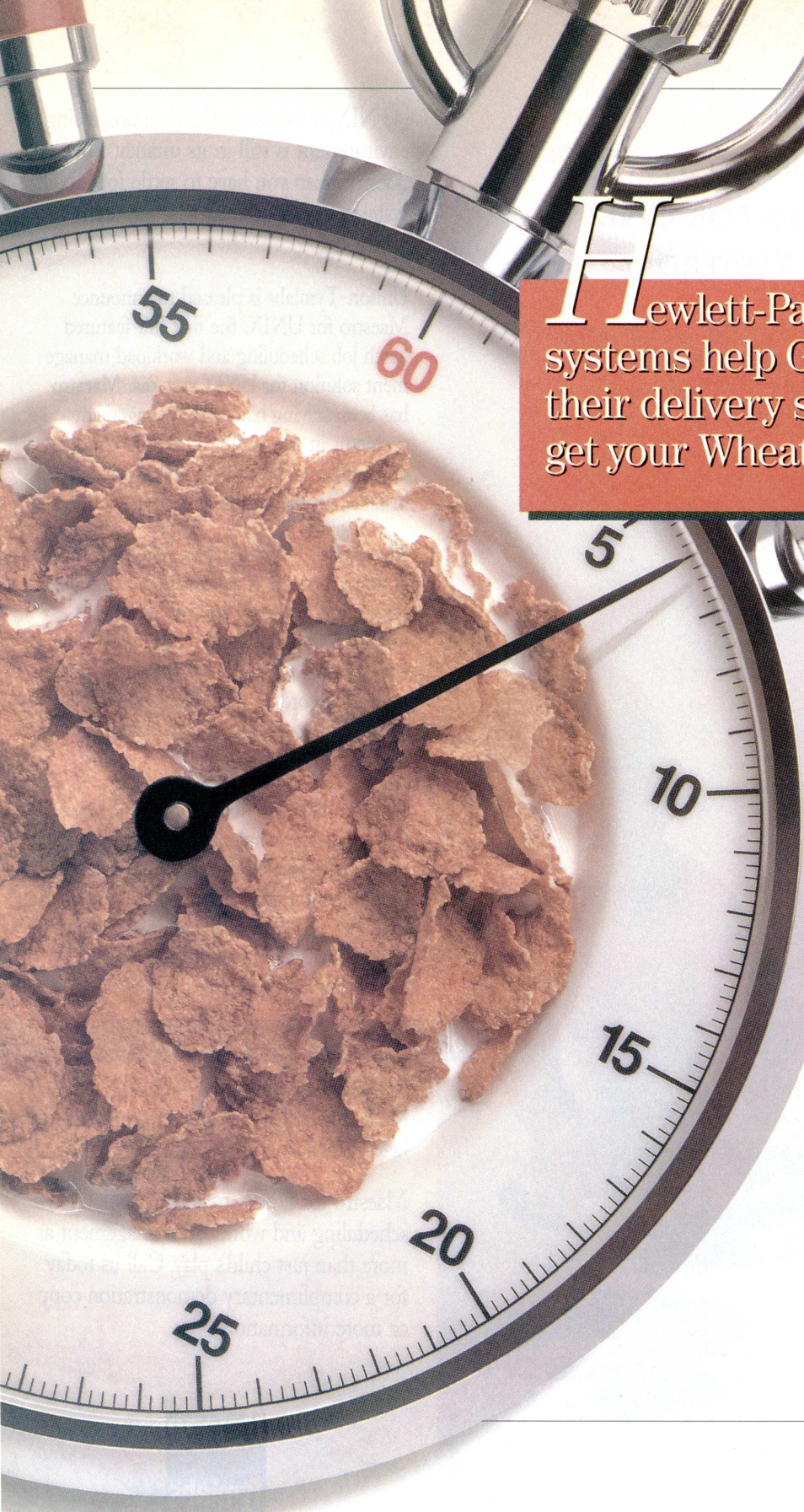
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Paradise Lost & Re-Found

The Information Superhighway Offers Us Another Chance

Because all sorts of folks from Al Gore to some little girl clad in black, standing in a snow-covered forest, have been wagging their tongues about the information superhighway, I feel obligated to comment on it as well.

As a reporter and editor, part of my job description is to be the eternal cynic. Therefore, I was going to attack the information superhighway with clever phrases that criticized the inevitable appearance of "toll booths" and "speed traps," or the stagnant, hidebound "on-ramps" that are often associated with the concept of an international information network. Yet, I must admit, I too yearn to be rolling down even a semisuper country lane in an open-top telecommuting convertible.

After being stranded in Boston's Logan airport during the latest Northeast ice storm, I realize that the past four days of my travel and meetings could have been conducted from my office — hell, from my home if I wanted to. In reality, the mental picture of the information superhighway is already further developed than many of us care to admit.

Granted, we can't yet access a yurt in Mongolia to get the latest recipe for yak, but the information superhighway is already basically here, with its infrastructure hidden in existing phone lines and orbiting satellites. Now it's a matter of how we choose to travel it and, more importantly, what we do with the time we save by exploiting the technology. Remember the old adage: The more you give, the more they want. Keep that in mind the next time you "sign-on" from home.

The superhighway offers us the chance to recapture what computers initially promised decades ago — an easier, less stressful workday with more time to spend enjoying life. But somehow we've let that escape us. For some reason we take computers on business trips and even on vacation. We gingerly cradle them on our laps, insisting they make us "more productive." Of course, an 18-hour workday is more productive, but weren't computers supposed to allow us to do the same, or even more, work in less time? Instead, it's time to let the computers take us around the world from our desktop and provide us with more efficient, less time-consuming options.

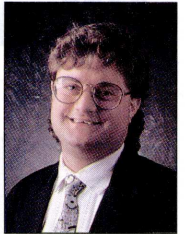
However, like most technologies at one time or another, the information superhighway is at a juncture where everyone involved must come to a consensual agreement about its definition. After that, it's up to the everyday travelers of the highway to be on guard to ensure that it doesn't become just another hi-tech means of getting more work out of less people, or at the very worst an over-priced Sega system.

So, what exactly is the information superhighway? According to entertainment giants such as Time Warner, it simply means movies-on-demand and the ultimate home shopping network. To phone companies such as MCI, it means face-to-face, long-distance calls. And for some publishing moguls such as Canada's Hearst Corp., the information superhighway is a vehicle for advertising.

For the true visionaries the information superhighway means a combination of all these ideas. HP seems to be on the right track with its Measurement, Computer and Communications program — MC², which brings these HP technologies together on the information superhighway.

The main argument against the information superhighway, like the warnings of the computer age, is the inherent loss of the human factor. Many "people-persons" are concerned that we will no longer be eyeball to eyeball in business transactions. However, I believe it's worth sacrificing the personal touch in order to gain back a personal life.

So you can talk mips and bips, speeds and feeds, and profits and returns, but if we don't allow the information superhighway to bring us closer to paradise, we're truly lost.



By Charlie Simpson

Charlie Simpson

All Eyes On The Enterprise

It's been said that it takes a long time to bring excellence to

maturity. So with a recent flurry of technology, product and strategic announcements in the first quarter of its 1994 fiscal year, HP is showing off its maturity as the new No. 2 U.S. computer manufacturer. Consider the following:

A RISC CHIP OFF THE OLD BLOCK

The PA-7100LC CPU. Announced in December 1993, the PA-7100LC CPU like all the CPUs in the HP PA-7100 series, maintains PA-RISC 1.1 compatibility and 48-bit virtual addressing while adding uncacheable memory pages, a little endian mode, and several new instructions for handling MPEG and JPEG compressions that operate directly on video pixels or audio samples. Little endian support provides the ability to run any operating system like Windows NT or Novell NetWare.

Designed to run at clock speeds between 0 to 75 MHz, the PA-7100LC supports external cache sizes from 8K to 2 MB. With 800,000 transistors and a 14mm x 14mm die size, the PA-7100LC is smaller than Intel's Pentium (3 million transistors on a 17mm x 17mm die).

ENTERPRISE COMPUTING INITIATIVES

HP 9000 Model 712 Workstations. The HP 9000 Model 712/60 and 712/80i (using 60 MHz and 80 MHz versions of the new

PA-7100LC CPU, respectively) are the result of HP's first attempt to merge the characteristics and provide the benefits of personal computers and technical workstations. Introduced in mid-January, the two new systems are the product linchpins of HP's Enterprise Desktop Program, a comprehensive set of hardware, software and consulting services.

Minimum configurations for each model include 16 MB RAM (expandable to 128 MB) two EISA expansion slots, 16-bit audio, one RS-232C and one parallel port, LAN, SCSI-2, keyboard and mouse interfaces and a 260 MB hard disk (expandable to 1 GB). An entry level Model 712/60 with a 15-inch color monitor (1,024 x 768 resolution) is \$3,995; with a 17-inch color monitor (1,280 x 1,024 resolution) the cost is \$6,170. An entry level Model 712/80i with a 17-inch color monitor (1,024 x 768 resolution) is \$8,820. The Model 712 runs HP-UX 9.03. Also available is Desktop HP-UX, a reduced operating system that can fit on the 260 MB disk.

Who needs an Enterprise Desktop? End users and IT professionals, according to Janet Muto, commercial market development manager for the Enterprise Desktop Program. "We had to offer all the benefits they already recognized in their personal world on a PC and a value-add over a PC like instantaneous access to multiple data sources in the enterprise, which is not that easy for the PC but it is in UNIX." Muto also points out that the Enterprise Desktops include a power-down capability to shut down the file system and a quick boot routine.

Besides the new 712 systems, the Enterprise Desktop Program also includes

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five new X terminals and the Enterprise Desktop Productivity Software Suite — PC emulation via HP WABI (Windows Application Binary Interface) 1.1 (\$349) and Insignia Software's SoftWindows (\$549) and HP's Ready-to-Wear Desktop Builder Kit (RTW DBK), as well as MPower 2.0, an upgraded version of HP's collaborative multimedia software. A 12-inch color flat panel display (\$13,995) with 512 displayable colors and 1,024 x 768 resolution also was introduced.

HP WABI 1.1 is certified to run 13 of the most popular Window applications at 486 performance levels. WABI "is basically a reverse-engineered emulation product that also makes native calls into the X windows environment. So it delivers very high graphics performance," says Muto. Insignia's SoftWindows runs all MS-DOS and Microsoft Windows applications with support for Novell NetWare, Microsoft LAN Manager, LAN Workplace, ODI and TCP/IP.

MPower 2.0, now includes HP Digital Video, a software-based video player that plays back full-motion compressed video at 30 frames per second directly from a disk. MPower client software costs \$195; server versions cost \$1,295. Also integrated within the MPower environment is HP's TeleShare. TeleShare is an optional expansion board available for the Model 712 providing telephone, fax and data-modem capabilities on the desktop.

The RTW DBK is a set of software and documentation that simplifies the configuration, administration and use of the enterprise desktops for IT professionals. "We modified HP VUE's [user interface] to meet the configuration guidelines we thought would be necessary in a client-server world," explains Muto. For those concerned with standards, Muto says "some of the key components of RTW will probably become part of the COSE desktop; if not, then we will continue to offer them as an added-value as part of RTW built on the CDE desktop."

According to MarketVision, a newsletter published by Summitt Strategies (Boston, Mass.), HP's new breed of PC/workstation clients are well-positioned to take advantage of a transition from personal to "enterprise-ready" desktops.

Enter Entria. HP's new small footprint X

terminals are designed for sites upgrading from 3270 terminals. The 14- to 19-inch color and monochrome X terminals with resolutions of 1,024 x 768 pixels include plug-and-play installation, Energy Star compliance, PCMCIA support and same-screen display of UNIX- and mainframe-based applications. Entria terminals conform to Dynamic Host Configuration Protocol (DHCP), which automatically assigns an IP address to a networked device. Performance ranges from 91,000 Xstones to 104,000 Xstones. Price ranges from \$995 to \$2,895.

HP Enware X station software (compatible with all of HP's X stations) includes HP Enware X Server Software 5.1 (\$695), with HP Visual User Environment/RX, which allows users to effectively manage multiple windows; Enware X Terminal Manager 1.0 (\$495) for network management, and HP Enware 3270 1.0 an optional Motif-based local client implementation of 3270 emulation for IBM host access. HP Enware also supports IBM AIX, Sun Microsystems' SunOS, Solaris 2.1 and SCO OpenDesktop software.

SERVING UP THE ENTERPRISE

HP 9000 Series 800 Model "E." HP's three new E-class servers — Model E25,

Model E35 and Model E45 — use 40 MHz, 64 MHz and 80 MHz versions of the new PA-7100LC CPU, respectively. Models E25 (\$5,969), E35 (\$8,319), are now available, and the Model E45 (\$11,319) is expected to be available in May. Each configuration includes HP-UX 9.04, 16 MB RAM (expandable to 512 MB), two HP-PB I/O slots (expandable to four) eight RS-232 ports, integrated 802.3 and SCSI-2 interface, and a parallel port.

Designed to provide a low-cost entry point for small and medium-sized businesses, the E class servers offer remote power on/power off capability and reliable UPSs. Pre-configured systems (HP Instant Ignition) are ready to run "out of the box." The new E-class servers are targeted to retail stores and bank branch businesses, two vertical markets where HP is well-established.

According to John Brennan of Workgroup Technologies (Hampton, N.H.), HP's new servers "gives HP the last piece of the enterprise, where mainframe applications can be offloaded to a departmental server." They also provide a competitive response to Intel-based Pentium servers now being offered by Compaq, IBM and Dell.

However with competitive threats from IBM's AS/400, Sun's SPARCclassic and Pentium-based PCs, Brennan thinks "turnkey and VAR expertise is critical to establish credibility and drive the necessary volume."

WANT NOT, WORRY NOT

HP 3000 Series 9x8 Servers. Eight new HP 3000/MPE systems are also sharing the limelight with its HP 9000/HP-UX relatives. According to Glenn Osaka, general manager for HP's Commercial Systems Division, the good news is that the 7100LC CPU is leveraged across all HP product families. But customers should understand that the two product lines server fundamentally different markets.

"While the HP 9000 clearly provides solutions for large companies that are re-engineering and adopting an open systems strategy, the HP 3000 targets users who need an 'application engine,'" says Osaka. "They are ideal platforms for small-to medium-size businesses that want to evolve to a client-server environment, yet



Commingleing PC and workstation technologies, HP's 9000 Model 712 systems are billed as enterprise-ready desktops.

HOW TO UNRAVEL THE CLIENT/SERVER MYSTIQUE.

First, accept that there is no mystique. Rather, there are hordes of slightly frantic software companies content to have you believe that effective open system solutions remain elusive while they rush to understand, develop, and market their interpretation of client/server. Then there's Lawson Software.

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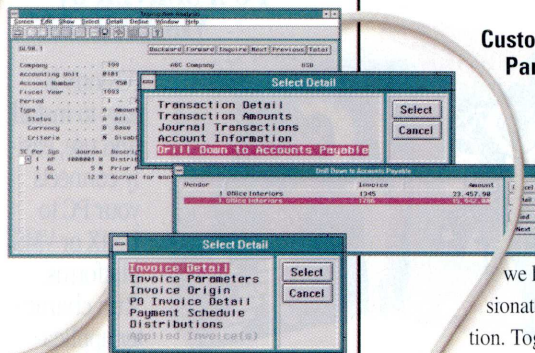
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still require high online transaction processing (OLTP) capability," he says.

Introduced at the end of January, the four two-slot 9x8LX models 918LX—\$11,750; 928LX—\$39,000; 968LX—\$62,000; 978LX—\$81,000) and four four-slot RX models (918RX—\$15,750; 928RX—\$43,000; 968RX—\$66,000; 978RX—\$85,000) also use the new PA-7100LC CPU. Basic configurations include 32 or 64 MB RAM, 1 GB disk drive, 2 GB tape drive, system console, integrated SCSI/LAN/Console interface card, a UPS and MPE/iX. Performance for the the 9x8 servers range from 53 to 153 transactions per second.

The Series 9x8 servers are easier and cheaper to expand than previous HP 3000 models. For example, the two-slot LX systems are upgradeable to the four-slot RX versions at a cost of \$4,000. Previously, upgrades cost at least \$10,000. With the included UPS, reliability is also increased. While transaction managers, print spoolers, job schedulers and system management tools are relatively hard to find the UNIX market, "the HP 3000 allows users to choose an application solution that's easy to install, manage and run," says Osaka.

HP'S EXCELLENT ADVENTURE

There can't be much doubt that HP has indeed brought and raised the level of excellence within and without its enterprise. And as an open systems provider, it clearly wants to do the same for its customers. Workgroup Technologies' Brennan agrees: "HP has been very successful moving to open systems; there's no reason to believe that they won't continue to be. But as DEC and IBM well know, excellence doesn't necessarily guarantee success in the computer industry.

"We know how hard we need to work to keep our edge," says Carol Mills, general manager for HP's General Systems Division. Mills also points out that HP is not a sales-driven company. We are driven to make contributions through technology." For now, HP is enjoying the benefits of working smarter, not harder. Says Mills, "We're not experts in the glass house, we are mastering the details of being distributed computing experts." ■

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Footless Or Firmly Planted

I disagree with much of what was said in [Gordon McLachlan's column in the December 1993 issue] about diskless PCs.

I have found that loading and running Windows over the network to be as fast, and sometimes faster than loading off a reasonably fast and SMARTDRV cached local drive. Supporting diskless PCs is easy: If a unit goes down, just swap the box.

Another important benefit is that diskless units do not need to be backed up. This is a time-consuming chore with local hard drives. You do not have to worry about maintaining a path statement in two different places and you don't need to run a disk cache or data monitoring program. It is all done on the server and done better than on standalone units.

I think there is a place for local drives on networked PCs. Advanced users use many more software applications and these are more easily administered off a local drive. However, many computer users, more than half, are not computer enthusiasts, hobbyists or magazine editors, they do not need expansion capabilities and they do not install software. Instead they have their units on all day, using them for word processing, analysis and perhaps accounting, instead of fiddling.

I hope you reconsider your position and perhaps talk to network users and administrators of diskless PCs. Diskless PCs are not about control freaks, they are a very desirable way of providing computer utility to a large percentage of computer users.

Mark S. Kurtz
Equipment Manager
Sy Art Parking Structures Inc.

In reference to Gordon McLachlan's [column in the December 1993 issue] regarding diskless PCs and the comparison of the HP Windows Client to diskless PCs, there are several points that I would like to make.

First, the HP Windows Client [offers] significant benefits versus traditional diskless PCs. These include: an integrated high performance LAN interface; no fan; no local floppy drive; extensive ROM-based diagnostics; Microsoft DOS/Windows and mouse; networking stack for TCP/IP and NS/VT (WRQ RNS/3000 connection); HP block mode and DEC VT emulators (WRQ R1Win and R2Win); and Windows-based installation utility with pre-configured boot images.

The HP Windows Client is designed for companies

who want to move transaction-oriented applications toward client-server computing using a PC front-end. The HP Windows Client provides a better solution than a diskless PC in these environments because it offers a significantly lower-cost 486-based desktop solution while retaining the manageability, control and security of terminals.

The HP Windows Client and a diskless PC will perform comparably in a transaction-oriented environment because users are most frequently accessing applications or databases located on a host computer or server. Due to recent advances in network operating systems, LAN interfaces and server-based disks, it is now also possible to get very good performance running Windows-based PC productivity applications, such as E-mail, word processing and spreadsheets. The HP Windows Client runs these applications locally and accesses the file server only when applications are downloaded and files are retrieved or stored.

Administrative and support costs (estimated by the Gartner Group at \$2,000 per year for diskless PCs) are lower with the HP Windows Client. A server-centric approach leads to easier software installation, upgrades, version control and license administration. Data integrity is enhanced because backups are easier and more reliable. The risk of virus introduction and unauthorized data removal is reduced because users don't have floppy drives. Network-wide disk space can be reduced by installing only one copy of PC software in a shared directory for use by many users.

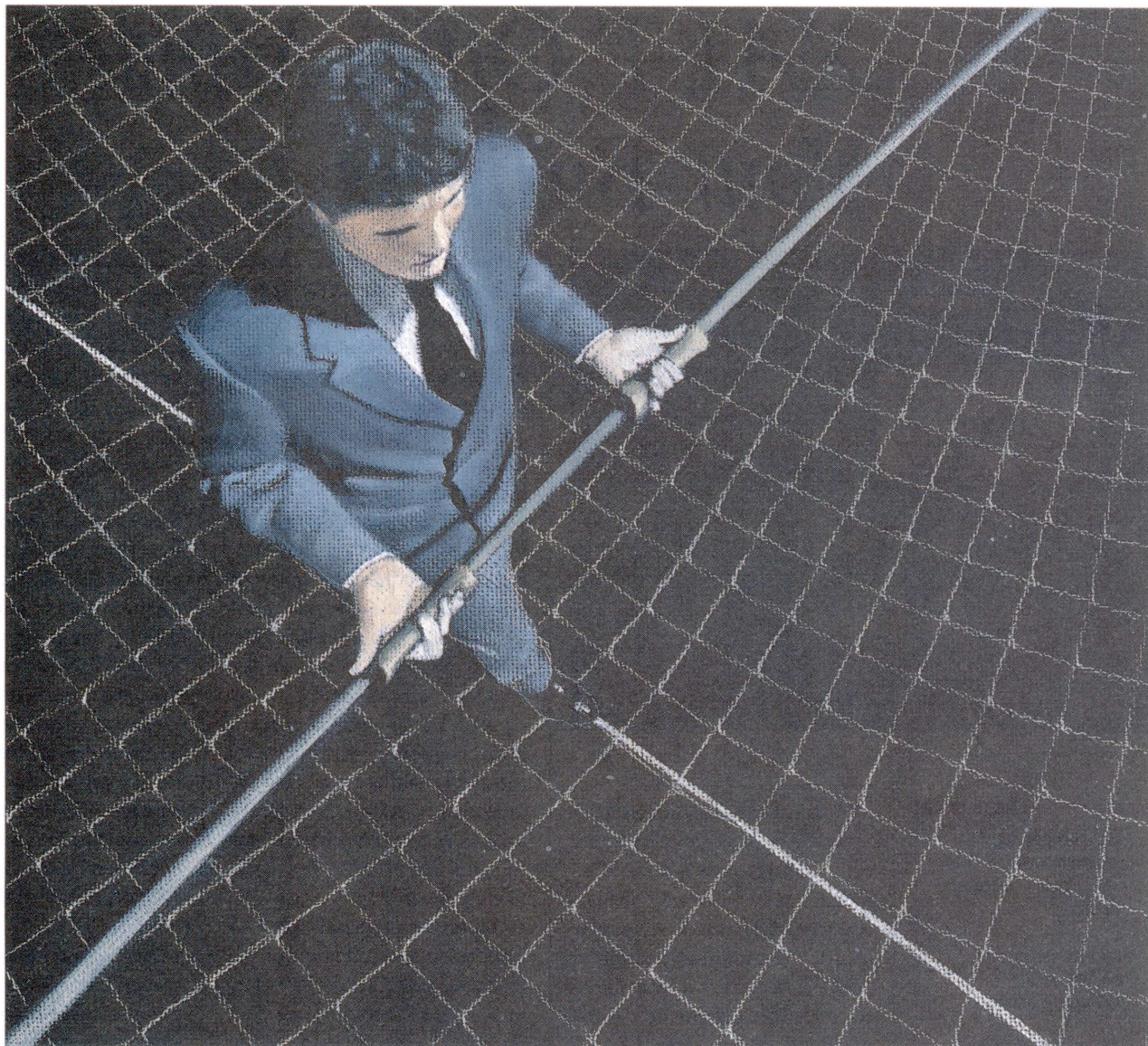
The low cost of the HP Windows Client (\$895 without monitor) and the benefits of a server-centric environment make it the right balance between user, system administration and organizational needs for many application environments.

Gregory A. Huber
Windows Client Marketing Manager
Hewlett-Packard Co.

HP Professional welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to: HP Professional, 101 Witmer Rd., Horsham, PA 19044. Fax number: (215) 957-1050. Internet address for staff listed on the masthead: LASTNAME @ CARDINAL.COM

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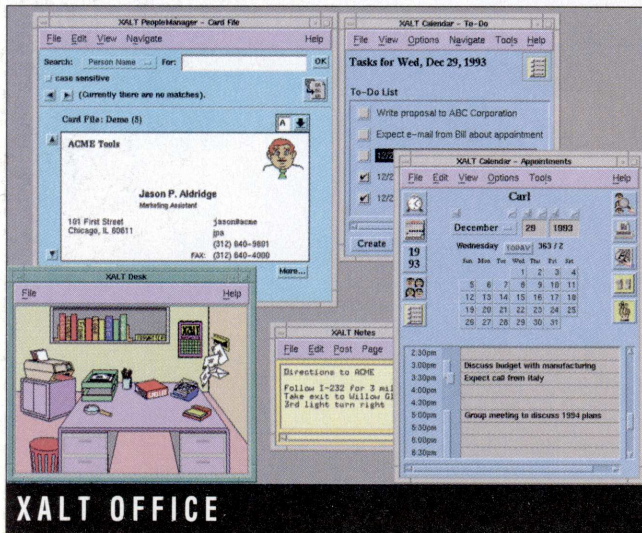
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ments a day-at-a-time," Luteran says. "It is more like a Day-Timers view." Schedules can be viewed on a daily, weekly or annual basis. It is also possible to maintain another person's calendar.

Users can keep a detailed To-Do list which carries over a list of incomplete tasks. While this list does not automatically link to the calendar, you can cut-and-paste specific items to appear as pop-up reminders or mail messages when the appointment time arrives. Digitized sound can also be added to reminders.

XALT Mail provides a complete mail service working with the open, standard mail delivery protocols found in UNIX workstations and systems. Mail is easy to send and receive and looks like a postcard.

However, Luteran says, "A missing feature that I found on the mail tool was a filter for incoming mail." But, according to Carl Koppel, vice president of Grafpont, users can now filter mail by various user-defined criteria. For example, users can request that the most recent mail gets placed at the top of the pile. Koppel says future releases will include the ability to filter and give priority to mail coming from a specific source. "The problem with filtering mail based on its source comes when you forget that the filter is there," Koppel says, "all of a sudden you start to wonder why you aren't getting messages from a specific person."

XALT People Manager is a module that uses a business card metaphor to provide complete information management for people and groups you work with. People Manager information can be accessed by the other XALT applications. For example, you can drag-and-drop a person's image from the People Manager into any time period in the calendar and a meeting is automatically set up, or you can address mail by doing the same.

XALT Notes provides more than just a message space. Notes can be stored for later use, and can be sent to one or several co-workers. Notes can be used to edit external ASCII text files. It provides instant communications, independent of the E-mail system.

Finally, XALT Desk interface provides an "office" with familiar objects representing the different parts of the product suite. A filing system allows you to organize and store your information. Blank books on the bookshelf can be customized to launch any third-party application. Information can be stored in customized folders within drawers. XALT items can be deleted by dropping them in the trash can, or printed by dropping them in the printer.

XALT Office runs on HP 9000 Series 700/800, Sun SPARC, Data General Avion or IBM RS/6000 platforms.

— Deborah Schwartz,
Assistant Editor

- Includes desktop, calendar, notes, E-mail and people management modules

- Information can be shared among different modules

- Can be installed on HP 9000 Series 700/800, Sun SPARC, Data General Avion or IBM RS/6000 platforms

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Circle 355 on Reader Card

Post-It notes and miscellaneous pieces of paper are littering your desk. "Call Bob about Denver deal," "Meeting with ABC Inc. — Tuesday @ 10," "Finish year-end report ASAP." Wouldn't it be easier to have all this information organized and in one location? XALT Office from Grafpont (San Jose, Calif.) can help by allowing users to create a "virtual office" with five integrated applications: desktop, calendar, notes, electronic mail and people management.

Tom Luteran, software development engineer with HP's Medical Products Group (Andover, Mass.), was looking for a fully integrated desktop product, so he installed a copy of XALT Office on their HP 9000/710 to see how it measured up.

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TurboIMAGE Shifts Into OVERDRIVE

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Circle 353 on Reader Card

Riviera Software (Austin, Texas) recently introduced OVERDRIVE-3000 for legacy TurboIMAGE applications. With OVERDRIVE3000, existing software can make use of the Critical Item Update (CIU) enhancement without re-programming.

The contents of a TurboIMAGE database can be altered by any of three intrinsic: DBPUT to add a record; DBDELETE to delete a record; and DBUPDATE to modify a record. In the case of DBPUT and DBDELETE, TurboIMAGE updates paths and sort chains as necessary. The original implementation of IMAGE did not, however, allow DBUPDATE to modify search or sort field values. These values could be changed only by deleting the record and then adding it back with the new search/sort values. This is a resource wasting process that gets worse as the number of unchanged critical fields increases.

With the CIU enhancement, the DBUPDATE intrinsic now can be used to modify TurboIMAGE detail dataset search or sort values. CIU also clearly reduces the number of logical and physical disk I/Os.

Delaying CIU's implementation was HP's indecision over

the future of IMAGE, and the debate over the need for, and advisability of, CIU.

Michel Kohon, co-founder of Riviera and the author of OVERDRIVE3000, points out that while the debates raged over CIU, millions of lines of code were written and tens of thousands of applications implemented using DBDELETE/DBPUT to modify critical field values. In order to take advantage of CIU, all that code has to be reviewed, modified, recompiled and tested. Or does it? Kohon decided there was a better way.

Existing software makes use of the Critical Item Update enhancement.

OVERDRIVE3000 works by detecting any attempts by a program to modify critical item values with a DBDELETE-DBPUT pair, replacing it with the more economical CIU DBUPDATE. The program logic is not altered.

OVERDRIVE3000 traps TurboIMAGE calls, looking for a DBGET-DBDELETE-DBPUT sequence. If, after a DBGET for a dataset, it finds a DBDELETE for the same dataset, the DBDELETE is deferred until the next event for that dataset. If the next event is a DBPUT, OVER-

DRIVE3000 checks if the used list consists of all the items in the dataset. If it does, it performs a CIU DB-UPDATE instead of the DBPUT. If the list is a partial list, the original DBDELETE and DBPUT are executed.

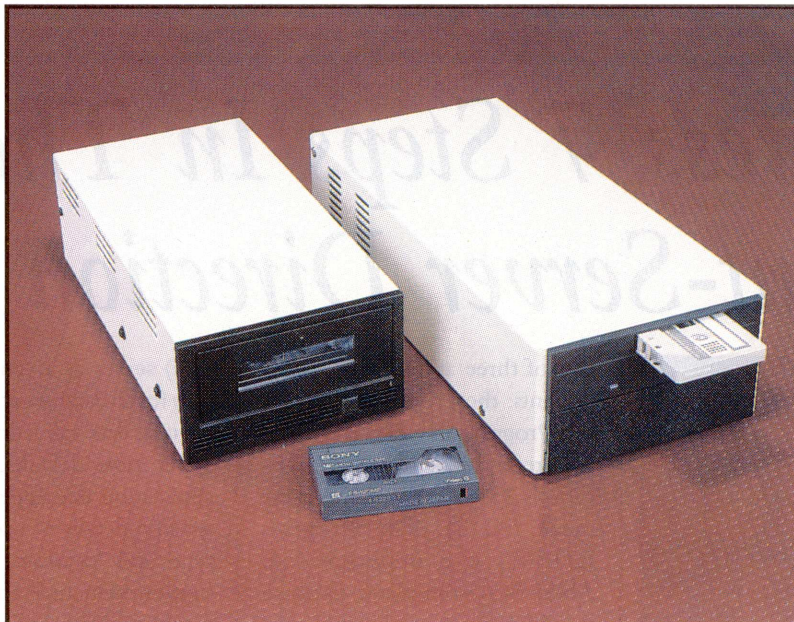
Kohon realized many people would be nervous about a product that affected the way their TurboIMAGE databases would be updated. Therefore, he created REPORT mode for testing, validation and monitoring. In REPORT mode, OVERDRIVE3000 does not actually replace any DBDELETE-DBPUT pairs, but measures and reports how much CPU time is used per transaction. Then, it calculates the expected minimum and maximum CPU savings.

Riviera Software and Lund Performance Solutions (Albany, Ore.) announced that Lund had acquired all rights to OVERDRIVE3000 and will be supporting and marketing the product.

OVERDRIVE3000 runs on MPE/iX release 4.0 and later. Price will range from \$800 to \$7,000 depending upon CPU model.

John P. Burke,
HP 3000 Editor

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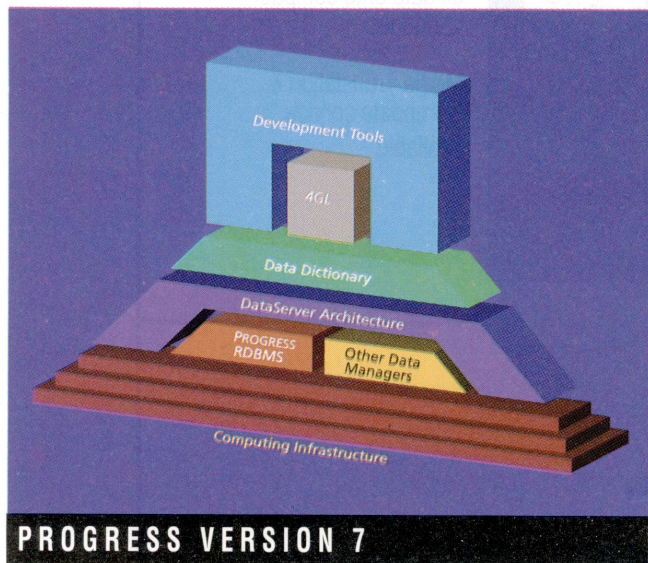
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The technological imperative "smaller, faster, cheaper" reigns supreme. Except when it comes to implementing relational databases; then it's more like larger, slower, exceptionally expensive. However, some products like Progress Version 7 from Progress Software (Bedford, Mass.) challenge that trend.

Rather than promote a particular database technology, Progress' goal was to focus on "what's appropriate for mission-critical applications in a client-server environment," says Bill Phelan, product manager for Progress Version 7. "Unlike Oracle and Sybase, we chose not to concentrate on just one particular database technology."

Available since September 1993, Progress Version 7 con-

sists of three architectural components: the Progress RDBMS, the Progress DataServer Architecture and the Progress Applications Development Environment (ADE). The Progress RDBMS is a multithreaded, ANSI SQL-compliant database that includes record-level locking, distributed database management with two-phase commit and query optimization features. According to Phelan, "because as much information as possible is contained in a single network packet, less information has to be passed from client to server." Consequently, network traffic is minimized.

Applications built with the Progress ADE can access the Progress RDBMS as well as a variety of other relational databases, file systems and industry standard interfaces through the Progress DataServer Architecture.

Supported databases include HP's Allbase, DEC's Rdb/VMS, IBM's AS/400, Object Design Inc.'s ObjectStore, Oracle and Sybase. File systems supported include Digital's RMS, and IBM's C-ISAM and CT-ISAM.

DataServer interfaces supported include Microsoft's Dynamic Data Exchange (DDE) and Embedded SQL for C. Support for Microsoft's Open DataBase Connectivity (ODBC) interface, says Phelan, will be available in the second quarter of 1994.

The Progress Data Dictionary (part of the DataServer Architec-

ture) serves as a central repository for all database schema, definitions, data validation rules and application defaults, insulating application developers from the specific details of each database type and location. Data types supported include character, integer, decimal, logical and date as well as arrays of field type. Audio and video data types are not supported.

The Progress ADE includes the Progress 4GL using an event-driven programming model. Added to Version 7 is the User Interface Builder (UIB) used to create graphical- and character-based applications, an application debugger, application help development, report builder and translation manager. Application interfaces include DLL, HLC and UNIX Pipes.

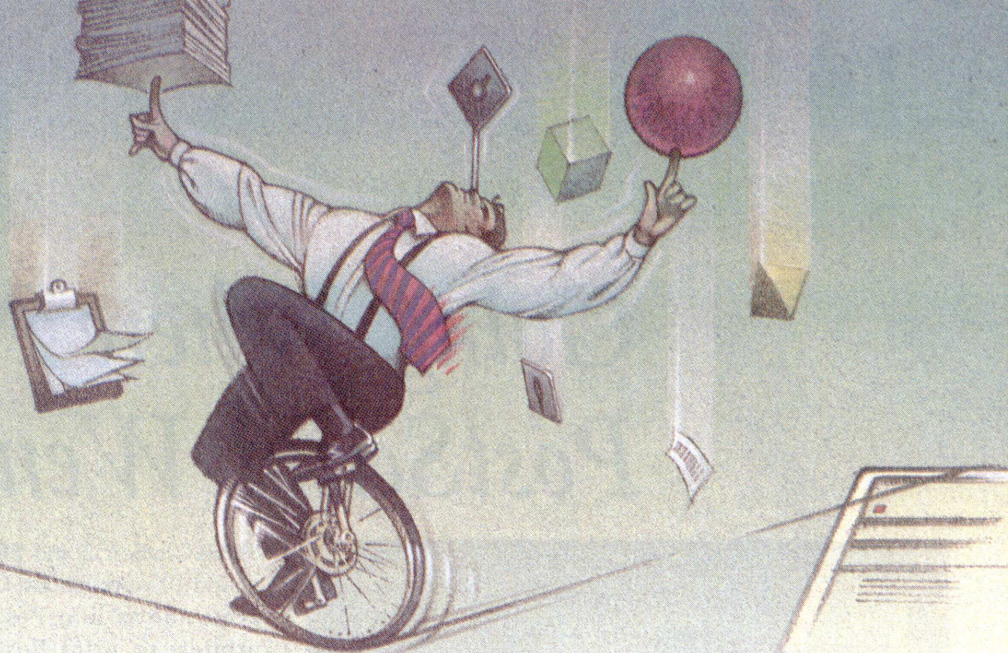
Progress Version 7 is available on platforms from Bull, Data General, DEC, HP, IBM, ICL, Microsoft Windows 3.1 and NT, NCR, Novell, SCO, Silicon Graphics, Sun, Unisys and Univel.

Progress offers unbundled product pricing, which Phelan says, "allows users to configure their host-based and client-server applications in a more straightforward manner."

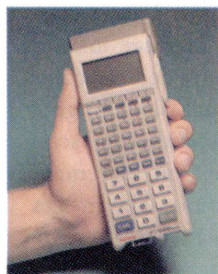
For the HP 9000 Series 700, a single user developer's version costs \$8,900; for 16 users, \$23,000; for an unlimited number of users the cost is \$29,000.

George A. Thompson,
Technical Editor

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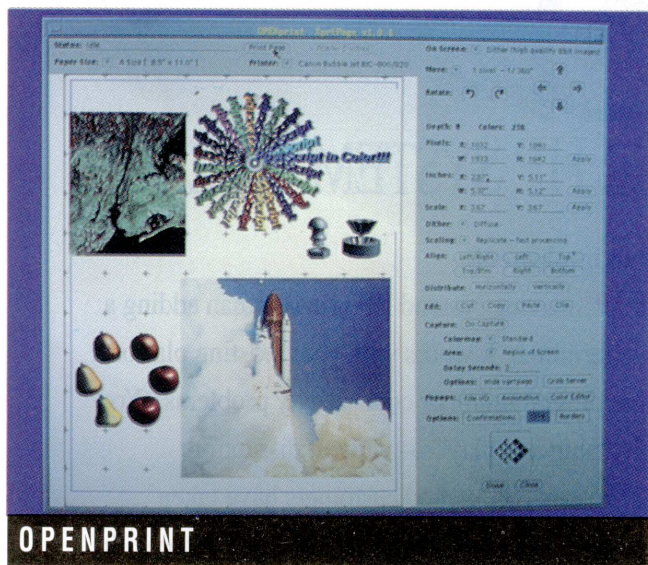
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"Since we have started to use OPENprint, the front-end has been improved, and some use it for presentations," Berlanga says, "but, more important for us, was the ability to print our generated PostScript files to both PostScript and HP PaintJet printers." OPENprint provides a host-based model of printing that allows users to buy or keep lower cost printer hardware, and protect the investment as workstations get faster and technology such as PostScript evolves to new levels.

The software also supports several output devices including printers from HP, CalComp, Kodak, Shinko, Tektronix, Mitsubishi and Seiko, as well as most PostScript-compatible machines. Users can apply standard "lp" or "lpr" print commands to generic print raster images (GIF, SRF, PPM, XWD), HPGL, text and PostScript documents from any UNIX-based system to almost any printer. It supports a minimum of 35 Adobe fonts.

Raster images can be auto-sensed and diffused-dithered, which avoids the PostScript pro-

cess altogether. The dithered image can then be automatically printed directly to a non-PostScript printer or converted into PostScript code.

With OPENprint's on-screen WYSIWYG editor, a user can compose a page consisting of one or more images. Utilities are provided for color correction, control of brightness, sharpness, dithering, scaling, image, rotation, placement and text insertion. The images or entire screen can then be saved in a printer with their pre-selected defaults.

OPENprint includes a suite of X Window-based imaging tools. Any user on the network can load, import, preview and manipulate various image formats and toggle the printer's built-in options through either an OpenWindows or X.11/Motif interface.

It also offers a standard printing architecture and user interface across all major UNIX platforms including support for HP 9000/700, Sun SPARC and IBM RS/6000 platforms as well as Silicon Graphics and DEC workstations.

HP and IBM versions cost \$700. OPENprint for Laser Printers (for HP and IBM) costs \$345.

— Deborah Schwartz,
Assistant Editor

- Supports a minimum of 35 Adobe fonts
- Supports HP 9000/700, Sun SPARC and IBM RS/6000 platforms
- \$700 for HP and IBM versions, \$345 for laser printer versions

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When the Research, Development, Test and Evaluation (RDTE) Division (San Diego, Calif.) of the Naval Command Control and Oceanic Surveillance Center (NCCOSC), needed to find a product that would allow them to print PostScript files to non-PostScript printers, they found that OPENprint from Colorsoft Inc. (La Jolla, Calif.) allowed them to do just that.

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Easing The Burden

Workstation Solutions Clears The Way For System Administrators



"We're trying to eliminate the need for administrators to have anything to do with backup or restoration."

James R. Ward
President
Workstation Solutions Inc.

Workstation Solutions Inc.

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A problem that has increased with the number of networked UNIX workstations is the difficulty of backing-up and restoring files when dealing with what can be huge amounts of data. For the sake of security, data files must be backed up, removed to inexpensive off-line media, then restored online to be revised according to end-user specifications.

When a system administrator's responsibility includes quantities of data that can reach to the tens or even hundreds of gigabytes, backup and restoration can be a time-consuming task. Quick Restore (QR), high performance backup and restore software for UNIX workstation networks from Workstation Solutions Inc. (Amherst, N.H.), can help ease the system administrator's burden.

"QR is a backup and restoration system that runs on seven or eight platforms, from Silicon Graphics and DEC Ultrix to the more mainstream platforms, like Sun, HP and AIX. The software is an integrated system using a client-server model, that runs on any of these machines and does backups to a centrally located server, usually a tape device," says James Ward, founder and president of Workstation Solutions.

Ward, a former Apollo Computer engineer, helped design Apollo's Domain operating system as well as backup and restore

solutions for Apollo. The company is applying concepts developed for homogeneous Apollo networks, to networks of heterogeneous workstations, according to Ward.

Based on the IEEE "tar" archiving standard, QR lets users read backup data on any UNIX host. Any tar-compatible program or product running on a UNIX platform can read any tape that QR writes. QR keeps an online catalog of each file's tape block location. It also positions the tape on the exact location of the file to be restored, speeding the restoration process.

Known as direct-to-block positioning, Ward says this technique allows QR to find and restore a file anywhere on a 5 GB tape in less than three minutes. This is faster than conventional restore methods, which read files sequentially and can take more than an hour to find and restore a file.

This is welcome news for administrators, including Gregory Shea, network specialist for LTX Corp. (Westwood, Mass.), a designer and manufacturer of testing equipment for the semiconductor industry. "We design the testing equipment hardware and write the software to control it. That software can get to be very large. We are currently developing a software engineering network that will eventually have 50 GB of online storage," Shea says. Currently, the installed hardware

base at LTX consists of HP/Apollos running DomainOS, Sun running SunOS 4 and 5, DEC Ultrix and HP running HP-UX.

Shea chose Workstation Solutions' QR for two reasons: "Because of the amount of data I have to backup — I have two stacking units that will hold 50 GB each — and the diverse, multiplatform network we have." Shea adds, "I don't have to hunt through all the tapes to find a person's backup. From my standpoint, it's great. From the users' standpoint, it tells them that their stuff is being backed up, which is reassuring for them."

According to Ward, Workstation Solution's goal is to provide a level of automation that will make life easier for system administrators — not something that UNIX has traditionally been famous for. "We're trying to eliminate the need for administrators to have anything to do with backup or restoration."

According to Ward, "Typically it's now about one administrator to 15 or 20 workstations. When we built system administration tools at Apollo, we had one administrator to 100 workstations. With modern technology on UNIX systems, there's no reason why we can't do even better than that."

—Sam Dickey,
Contributing Editor

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Either Way You Win.

CIRCLE 458 ON READER CARD

Counting On A Future With UNIX

Multiview Begins To Port Its Financial Applications To HP-UX



"We see people sticking their toes in the UNIX water by migrating a small business entity, like a division, to see how it works out."

John Leslie
President
Multiview Corp.

Multiview Corp.

One Van De Graaff Dr.
Burlington, MA 01803-5171
tel: (617) 229-2225
fax: (617) 229-1635

CIRCLE 351 ON READER CARD

Multiview Corp. (Burlington, Mass.), a supplier of financial applications for HP platforms, is a company with a philosophy that financial managers can relate to: Keep an eye on the long term, go with a winner and avoid unreasonable risk.

Formed in 1990, following the leveraged buyout of a suite of financial applications originally developed by Cognos Corp. (Burlington, Mass.) for the HP MPE platform, Multiview is now a leader in the HP MPE software market with 1,600 applications installed, and over 400 international clients across a range of industries.

Multiview was designated an HP Channel Partner ISV in 1990, and in September of last year, an HP value added reseller of HP hardware with Multiview applications. According to John Leslie, president of Multiview, the relationship has been good. "HP gives their clients, our clients and prospective clients — be they on DEC or Wang or Data General or another platform — the ability to buy a mainframe level machine for not much money. With that technology, and a third-party program that is one of the best in the industry, they're a good business partner."

Although Multiview products have always been available for MPE, and for two years, for MPE/iX, Multiview has been cautious about porting to UNIX. Its first HP-UX products — General Ledger, Accounts Payable and Purchase Order packages — will be available after the first half of 1994 followed by client-server versions before the end of the year.

According to Leslie, Multiview did not rush to get on board the UNIX bandwagon. UNIX has become such a powerful buzzword in the industry, he says, many people, HP users among them, will consider migrating to UNIX for that reason alone. Still, Leslie doesn't expect a stampede. "We see people sticking their toes in the UNIX water by migrating a small business entity, like a division, to see how it works out."

One HP/Multiview user who shares Leslie's caution is Ken Bender, director of accounting for Meadox Medicals (Oakland, N.J.), a medical devices manufacturer. Currently running Multiview for MPE on an HP 3000 Model 947, Bender says, "When it comes to UNIX, all I can do is repeat what I've read. But I do know that non-systems people tend to think that UNIX means open systems. In other words: 'I can buy any hardware or software I want.' And I know that's not necessarily true."

Bender adds, "For our cur-

rent leasing period, we're sticking with MPE. After that, I'm sure we would entertain the idea. You will investigate anything new. That's just a natural instinct. But if you look at the available applications and find that there aren't sufficient choices to meet your needs, you may wind up going back to MPE."

For now, Bender's financial application needs are met. Coming from a background in IBM mainframes, Bender says, "Dollar for dollar, Multiview is the best value in financial software that I have come across in my 17 years of professional experience."

Once its products are available for HP-UX, would Multiview consider porting to other UNIX versions? Not likely, says Leslie. As in the past, Multiview has chosen to stay with HP. "You see a lot of software companies make the mistake of taking support dollars out of their customer base and using them to port to other platforms. We have opted not to do that."

—Sam Dickey,
Contributing Editor

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Single-Minded Focus

Bradmark Technologies Inc. Sticks With Database-Oriented Philosophy



"As a database utilities company, we can't say, 'we are going to move to UNIX.' We have had to select the databases that are the most popular under UNIX."

C. Bradley Tashenberg
President and CEO
Bradmark Technologies

Bradmark Technologies Inc.

4265 San Felipe
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One company. One mission. That's the corporate philosophy behind Bradmark Technologies Inc. (Houston, Texas), according to C. Bradley Tashenberg, the company's president and CEO. Tashenberg who also classifies himself as a "senior programmer" founded Bradmark in 1981, after deciding to provide the "most comprehensive database utility [for HP's IMAGE] that was out there."

"Most people were developing applications for IMAGE," says Tashenberg, "so I decided to stick with something that was database oriented." Ten thousand customers and 25 countries later, most HP 3000 users are now quite familiar with DBGeneral, one of Bradmark's products.

However, like many new products, adding features to DBGeneral became more "chronological than organized."

Now, DBGeneral is divided into nine functional areas with over 40 functions neatly and systematically organized. In 1984, as the industry turned to management-oriented solutions, Tashenberg took an analytical approach. "It was better to develop products that could watch or do the work for you. There was no reason, why people had to police the system, when it can do it itself." He points out, however,

that "other products only gave resolutions. You had to experience the problem before you could solve it."

In June 1990, Bradmark bought DBAudit from Robelle Consulting Ltd. (Langley, British Columbia). DBAudit provides insights into a database transaction log file. Tashenberg says, "DBAudit can tell you everything that happened and when. Is it really the system that screwed up, or some other violation? You can tell if someone changed a field in the database." DBAudit also provides a means of monitoring database activity.

In the future, Tashenberg expects to "expand our product suite with more solutions but keep our orientation in the database world." For example, in September 1993, Bradmark introduced DBGeneral performance activity monitor option for Oracle (available this month); earlier in April, a version was released for Sybase. "DBGeneral will be able to function over multiple database environments," says Tashenberg. Support for Informix is currently in the works and eventually for Ingres.

"We felt that in order to stay with HP, we had to change direction along with them," says Tashenberg. That, of course, means open systems. "As a database utilities company, we can't say, 'we are going to move to UNIX.' We have had to select the databases that are the most

popular under UNIX." Tashenberg also expects to broaden the company's horizons "by offering a multiplicity of solutions." For example, Core Superdex, the primary engine of Bradmark's database indexing technology is being shipped with copies of IMAGE/SQL through HP's Quick Start IMAGE/SQL Kit.

Core Superdex allows users to build indexes on master and detail datasets and allows partial and generic range retrieval as well as sorted access. Superdex is an integrated addition via the Third-Party Indexing Interface (TPI) to TurboIMAGE. "It seemed like a good opportunity to help support IMAGE and IMAGE/SQL," says Tashenberg. Users can also anticipate the introduction of a report writer, report librarian and forms generation among other products from Bradmark.

Tashenberg thinks that the open systems concept is an excellent one. He says that for users, "it won't matter whether you are using HP 3000 or HP 9000 [systems], or Apollo workstations." But as an ex-MIS manager who replaced his first IBM mainframe with an HP 3000 more than 20 years ago, Tashenberg realistically knows that "only time will tell."

—George A. Thompson,
Technical Editor

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A Diamond In The Rough

James Avery Finds A Real Gem With CA Unicenter

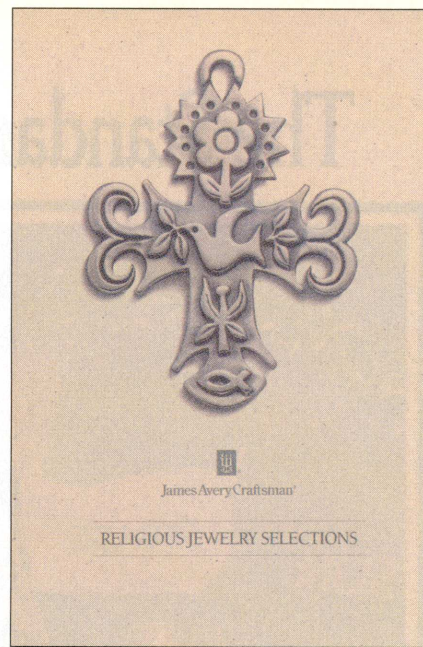
For auditors, there are two kinds of controls: effective and ineffective. For John Pittman, vice president of MIS for James Avery (Kerrville, Texas), a privately-held jewelry manufacturer and retailer, the need for effective control is an inherent part of his thought process. So that's exactly what Pittman, a former EDP auditor for 12 years, was thinking when he began looking for products that would help him control his HP-UX environment — tape backup and recovery, tape library management, front-end security and problem management tools.

But until Pittman discovered CA Unicenter from Computer Associates International (CAI; Islandia, N.Y.), there wasn't much to be found. All the other products that he had seen "were point solutions that wouldn't interact with anything else."

With IBM mainframe experience, Pittman was already familiar with some of CAI's products. He was further intrigued when he discovered that CAI was not merely converting their mainframe product but rather porting their technology and designs to "make those kinds of control mechanisms available to midrange users." Pittman eventually became one of the first

to acquire and install CA Unicenter, but even after an effective product demo, he was still skeptical.

Faced with HP 3000/MPE applications that pre-dated him by about 15 years, Pittman "recognized that we couldn't handle the future of [James Avery] with the old undocumented, unsecured, poorly designed, poorly executing 3GL application software." So three years ago, he began moving to HP 9000 systems running HP-UX.



An HP 9000/807 and an HP 9000/827 are already running within the company's corporate headquarters and a new HP 9000 G50 is destined to become a production system. According to Pittman, those systems exchange

continued on page 32

Starting From Scrap

Most companies know who to contact when they are looking to purchase new computer equipment, but many don't have any idea where to take the equipment when the time comes to get rid of it. A recent study by the Carnegie-Mellon Foundation predicted that unless this quintessential ecological problem is addressed, 150,000,000 machines — enough to fill the Empire State Building three times over — will wind up in landfills by the year 2005.

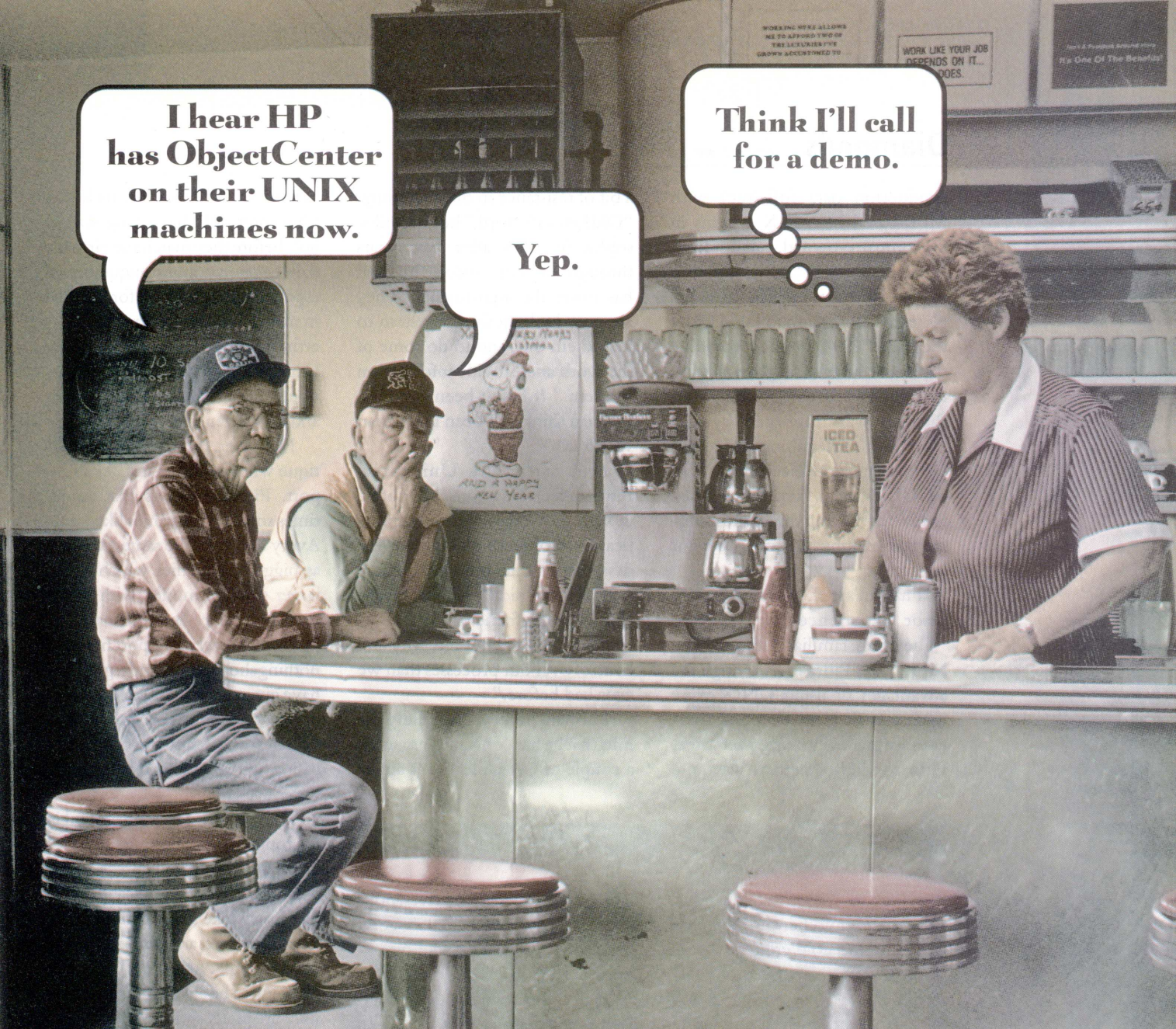
Tom Buechel, owner of Rockaway Recycling (Rockaway, N.J.) has been collecting various metals, including aluminum, brass and copper, to be recycled for the past 17 years. In 1980, a contractor approached Buechel with a new item — five computer circuit boards. Since then, Rockaway Recycling has collected various

computers and related equipment for the gold and other metals that are found on them.

Rockaway Recycling is currently collecting electronic inventory, which sometimes amounts to an entire computer room, from a number of sources. Aetna, AT&T, Chase Manhattan Bank, Chemical Bank, E.F. Hutton and Prudential are among Rockaway's major clients. Buechel says the scrap business has slowed because many of the mainframes are already gone, but it will not vanish overnight. "We are still getting the scrap from multimillion dollar systems that were generated in the '70s and '80s." Rockaway services an area that covers Massachusetts through Virginia.

When Rockaway receives a shipment of computer equipment,

continued on page 32



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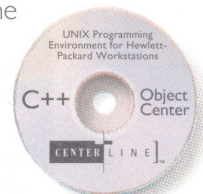
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CIRCLE 274 ON READER CARD

Diamonds continued from page 30

production data (off-line) with MPE-based MicroGX systems in 26 company-owned, retail stores.

After a year "in production mode," Pittman expects to complete the conversion to HP-UX by the end of 1994. Besides providing the data center management tools that he had been searching for, Pittman was impressed by CA Unicenter's integration and by the graphical user interface (GUI). With a GUI, Pittman "saw the real potential for making things meaningful and making the job easier for people."

Pittman's staff, however, had no prior experience with UNIX. "They were familiar with and liked MPE," says Pittman. Although the advantages of using UNIX were unclear at first, the fears and anxieties are gradually being overcome. Pittman admits that there was quite

a bit of resistance in the beginning. "Old loves, die hard," he says philosophically. But after two years through the conversion, his staff has made the adjustment. "They are now looking for the system to help them out, and to do some of the work and provide information to them." It hasn't been easy, but Pittman thinks it's been more than worth it.

And with CA Unicenter, Pittman feels his efforts will not be in vain. "I've now got the sophistication of other products that were designed to run on a mainframe system, that typically were not available in a mainframe or MPE environment, with better integrity and control over our processes than we ever had before."

Pittman, however, candidly admits that he has "only implemented a couple of CA Unicenter's appli-

cations so far" and he feels CA Unicenter "still has a long way to go" before they match the virtually flawless operation and unquestioned capability that's taken for granted in mainframe environments. Nevertheless, CA Unicenter has so far helped Pittman take some the "mystique out of tasks like file archiving and tape retentions."

However, there's been no mystique when it comes to CAI's support. Pittman knows that sometimes smaller companies like James Avery don't get the same attention as bigger companies which spend larger sums of money with a particular vendor. But Pittman says that CAI's level of support has been nothing short of outstanding. "They have given us an incredible amount of one-on-one attention," he says. "They are constantly in communication with me and my technical staff."

Pittman recognizes a diamond in the rough when he sees one. Like an uncut gem, Pittman appreciates the potential of CA Unicenter and knows that it will take some polishing. So, although there are some problems now, he expects that CA Unicenter "is going to be a world-class piece of software pretty soon." According to Pittman, CAI is now in the process of perfecting their product. And for him, "having something and perfecting it is a far cry better than having nothing at all."

Pittman, however, thinks his mainframe mentality doesn't always mesh with the majority who "seem to think of control as being overhead or something that is going to encumber people." But Pittman doesn't see it that way. "To me it's just a part of prudent business practice to get these kinds of controls in place so we can then manage our own environment."

*George A. Thompson,
Technical Editor*

Scrap continued from page 30

it ends up in one of two locations. The better equipment — the one's with a higher gold content — are stripped down on the spot. The circuit boards, copper wires and back panels are melted down and recycled. The steel frames that re-

main are compressed into large bricks and then sold to a junk yard.

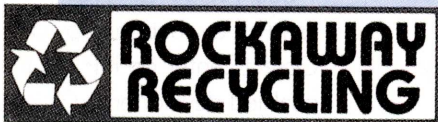
Newer equipment is sent to Second Byte Computers (Dover, N.J.), a division of Rockaway Recycling. The technicians at Second Byte strip the bad parts off the computers, and then recondition, refurbish or upgrade the systems. The computers, memory chips,

fans, hard drives, floppy drives, print heads, etc. are then resold. Second Byte also builds custom configurations of new systems.

A popular attraction at Second Byte is a warehouse that is referred to as "The Hacker's Hangout." The equipment found here ranges from systems manufactured in the '60s, '70s, '80s and '90s and many of these products are sold at substantially lower prices. Buechel says, "Test equipment that might have cost \$3,000 ten years ago, is now sold for \$100."

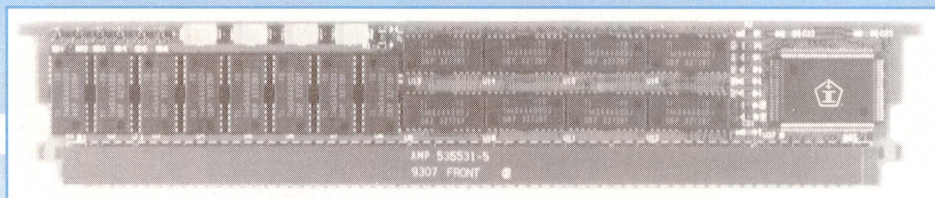
As long as the need is there, Buechel intends to continue recycling computers. He says Rockaway Recycling operates with two mottos: "Fair weight, fair price" and "Join the green movement today."

*Deborah Schwartz,
Assistant Editor*

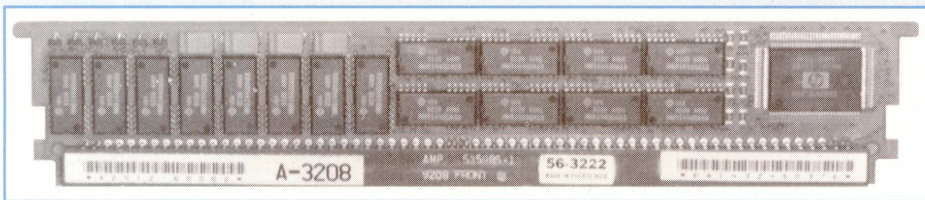


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In The **Midst** *Of It* **All**

IT'S A TOPIC that can keep any computer industry gathering in gab gridlock longer than it took to focus the Hubble telescope. How to pave the information superhighway?... Not a bad guess, but for days of guaranteed discourse and disagreement, ask about "middleware." Have I touched a nerve?

Middleware, in its simplest terms, resides between the operating system and your applications. These are the invisible, logical connections and translators crudely called middleware; the strings, springs and ends of things that make much of computing, particularly networked, client-server computing, work.

Paul Mason, manager of system level software for International Data Corp. (IDC; Framingham, Mass.), whose job it is to have the last word on the middle word prefers to think of middleware as software that acts as a translator between systems that otherwise

Everywhere, Yet Nowhere.

**What And Where, Is This
Thing Called Middleware?**

BILL SHARP



In The Midst

can't communicate. "It's sort of like an interpreter at a U.N. meeting," says Mason. "An Israeli is talking to someone from Japan, so you get a person in the middle to translate."

According to Mason if a utility residing on Novell NetWare pulls down a file from your mainframe or HP 3000, so that all you see is a file name in your desktop PC windows environment, that utility qualifies as middleware. Mason says the earliest reference to middleware he can find dates back 10 years to a small software company. So the term has been knocking around for some time, even though its acceptance in the vernacular has been, shall we say, middling.

In The Middle Of Things

PIETER R. MIMNO, PRESIDENT of Technology Insight Inc. (Marblehead, Mass.), a consultant and expert in client-server development tools lists specific middleware functions as (see diagram):

- Object management
- Network management
- Global naming
- Remote procedure call (RPC)
- Version control
- Configuration management
- Security
- Transaction manager

He points out that support of middleware is by no means complete among application development tools. UNIX client-server development tools lack middleware support for the most part, because vendors are waiting for standards pending from the Open Software Foundation (OSF; Cambridge, Mass.).

While Mimno's list includes many functions that have been

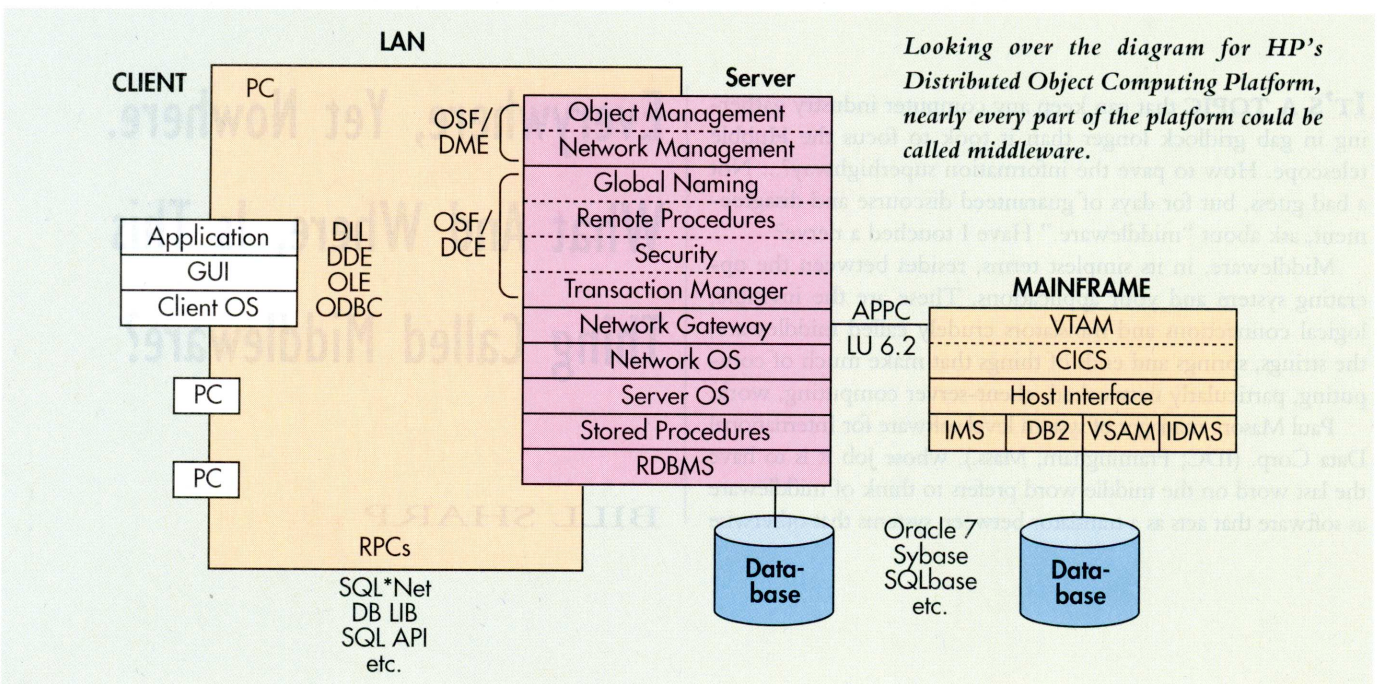
called middleware, his list is not all-inclusive. Because it links disparate systems to make communication possible, a gateway from your client-server system to a mainframe qualifies as middleware, as does any SQL function that communicates with an otherwise incompatible system.

Middleware can be as complicated as the software spanning and connecting several different systems in succession to retrieve data. Or, it can also be as deceptively simple as a printer driver. Another point made by Mimno is that middleware must follow the trends of the marketplace. Because Windows dominates the desktop, client applications and the middleware connections they use must play along with Windows. On the server end, there is no dominant set of standards as yet.

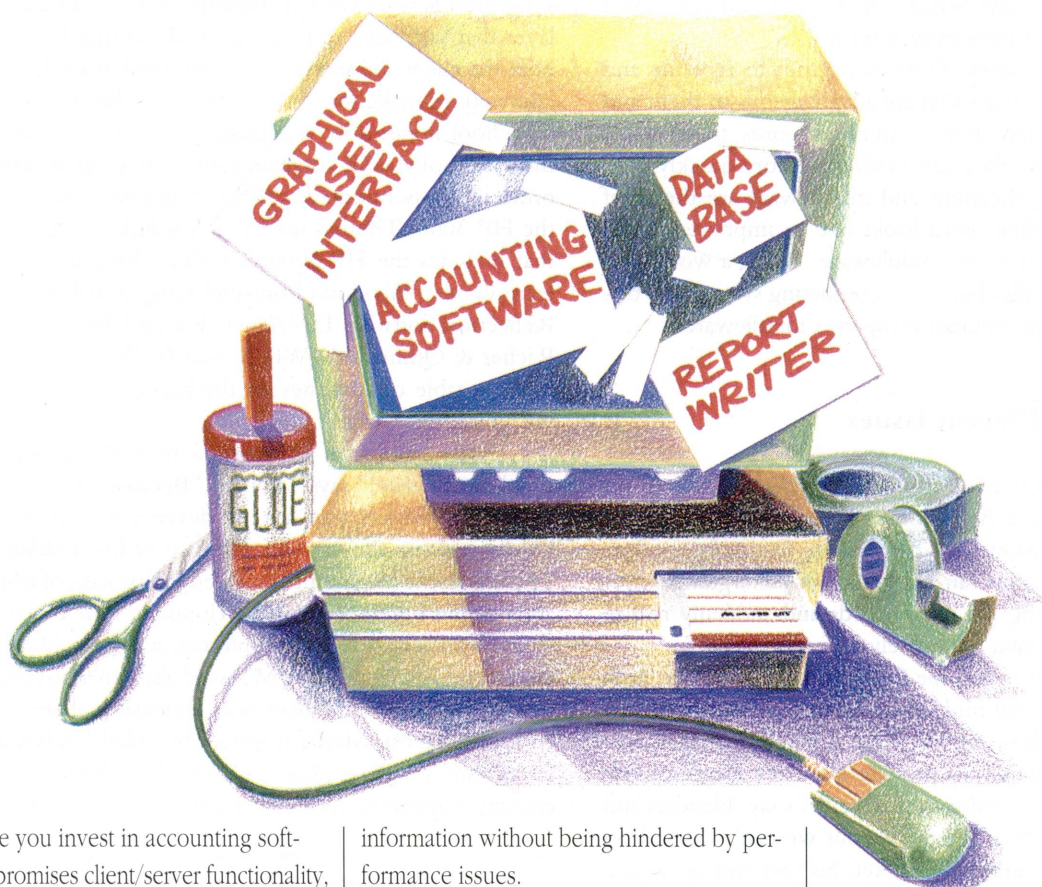
Because of this variation, users planning for the long term, or building large systems, need to think about middleware. "Vendors seek to lock users into dependence on a proprietary middleware product," says Mimno. "The only way to avoid that is by rigidly enforcing standards." Within your organization, this may not in fact, mean picking an industry standard, but standardizing within your company to make your systems as compatible as possible.

The benefit of industry standards is that they generally increase your selection of solutions, while enhancing competition and holding prices down. Mimno advises looking for client-server development systems that support OSF's DCE and DME standards for middleware connectivity on servers. He further advises growing into development systems that support the Object Management Group's CORBA specification.

There is by no means unanimous approval on the meaning of middleware. Tilman Schad, general manager of the Software Business Unit within the HP Computer System Organization, has developed a healthy distaste for the term. "I try to avoid the [middleware] term," says Schad. "Middleware is the soft-



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ware equivalent of the client-server [hardware] architecture."

Instead, Schad generally uses a specific word for the function being discussed — for example, data management services. To Schad, the software in question is designed to manage the decentralized infrastructure for mission-critical applications. The term middleware "leads to a lot of misunderstanding," he says.

Confusion results from the speed at which the computer industry and its markets evolve. "A year ago, graphical user interface (GUI) building was part of CASE — now it is part of the operating system," says Schad. "As soon as you agree on a definition, the world moves away from it."

Fierce competition drives firms to attempt to redefine and partition the market in ways that are advantageous to them and disadvantageous to competitors — in other words, to carve out market niches. Because they can evolve far more quickly than hardware, software applications and middleware are the chief tools of this battle. Often, what looks like an improvement in an application is in fact better middleware. When a word processor pulls data from files built by a competing system in a different format, the improvement is superior middleware.

Same Words, Different Issues

DISAGREEMENT OVER MIDDLEWARE is anything but unusual these days, says Asa Lanum, senior vice president of the Technology Division for OpenVision Technologies Inc. (Pleasanton, Calif.), "You can have two people arguing vehemently about this using the same words and suddenly realize you are talking about two completely different things."

Lanum, who travels to Europe for standards discussions, finds wall outlets to be a useful middleware analogy. "But from one country to another those outlets have different voltages, frequencies and socket shapes to provide our basic electrical systems and services. As a vendor, we make, let's say, blenders and toasters. We want to plug [them] in, but we can't depend on the [proper] voltage, current or socket. So you end up with a box of adapters that you carry from country to country to get them all to conform to some standards. We can call that box of adapters 'middleware.'"

In an example of middleware run amok, one user bought OpenVision's high-availability software product, which maintains a Sun computer in a standby, "hot" backup mode. In order for this feature to function properly, all the systems had to be linked in a network that used global naming (middleware) to effectively identify all the systems on the network.

Two networks were combined to take advantage of the new capability, only to find that one of the major systems on the network immediately powered down. Apparently, two systems on different networks were given precisely the same name. When the networks were combined, one of the two identically named systems reacted as programmed, and removed itself from the network.

Keeping tabs on the status and progress of middleware is an important part of the job for information systems managers.

MIS managers may find themselves more a keeper of connectivity and standards than of any particular hardware or even software — ensuring that systems will function seamlessly to get the job done will be the measure of success. To keep the connections effective, the MIS manager must know enough about middleware to ensure that the connections between systems are clean and efficient, not muddled and ineffective.

"You have to think about middleware," says Greg Thomas, director of information services for the Washington County Education Service District (Portland, Ore.), "You have another layer that you have to be cautious about that links to tools on both the client and server sides." But used properly, middleware connections make for some impressive solutions.

School libraries in Washington County now share a common TurboIMAGE database card catalog on an HP 3000. In order to allow hundreds of PCs in different schools to link to the HP 3000, Thomas used a WAN link to a LAN backbone that includes the HP 3000 as well as three other servers. His team wrote a Windows front-end using Visual Basic. Using the Reflection Software Developers Kit middleware from Walker Richer & Quinn Inc. (WRQ; Seattle, Wash.), the application builds a table of addresses on the backbone so inquiries go to the appropriate server.

"Each time you bring in a new tool, you face that middleware issue," says Thomas. "Because of the dynamic nature of the market, you have to develop at a breakneck pace." So, by making the best possible use of his middleware tools, Thomas hopes to continually speed the process of bringing new applications online, cutting development time by 60 percent.

But middleware remains confusing, and some, like HP's Schad, would prefer to banish the "M" word altogether, insisting on more specific terms. But still there is an undeniable allure to an all-encompassing term. Maybe it should be called Everywhere. Almost Everywhere? Of course, because it underlies all mission-critical client-server applications, why not call it — Underware.

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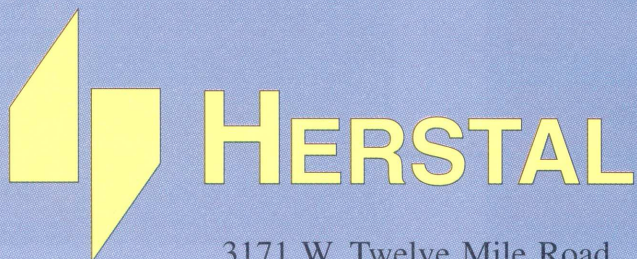
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By 1996, the application server market will account for 30 percent of all LAN server sales; file servers will account for the other 70 percent.

over 30 joint projects across 12 HP divisions over the past five years. But the development of NetWare for HP's PA-RISC platform (internally code named Piranha) created the most excitement. However, the wait will be over in the second quarter of 1994 when the final product will be introduced.

HP has been working with Novell to create the interface between Processor Independent NetWare (PIN) and HP's PA-RISC platform. Referred to as the NetWare System Interface (NSI), NSI binds PIN to the PA-RISC processor. The NSI allows Novell's partners to develop all underlying drivers and optimize this layer for their specific platforms. Any platform supporting PIN, including Intels, will need to have a similar compatible layer to tie PIN to the CPU. PIN, evolving from NetWare 4, therefore effectively removes CPU dependencies and provides the freedom to choose the best server platform

whether CISC- or RISC-based, for global, heterogeneous networking applications.

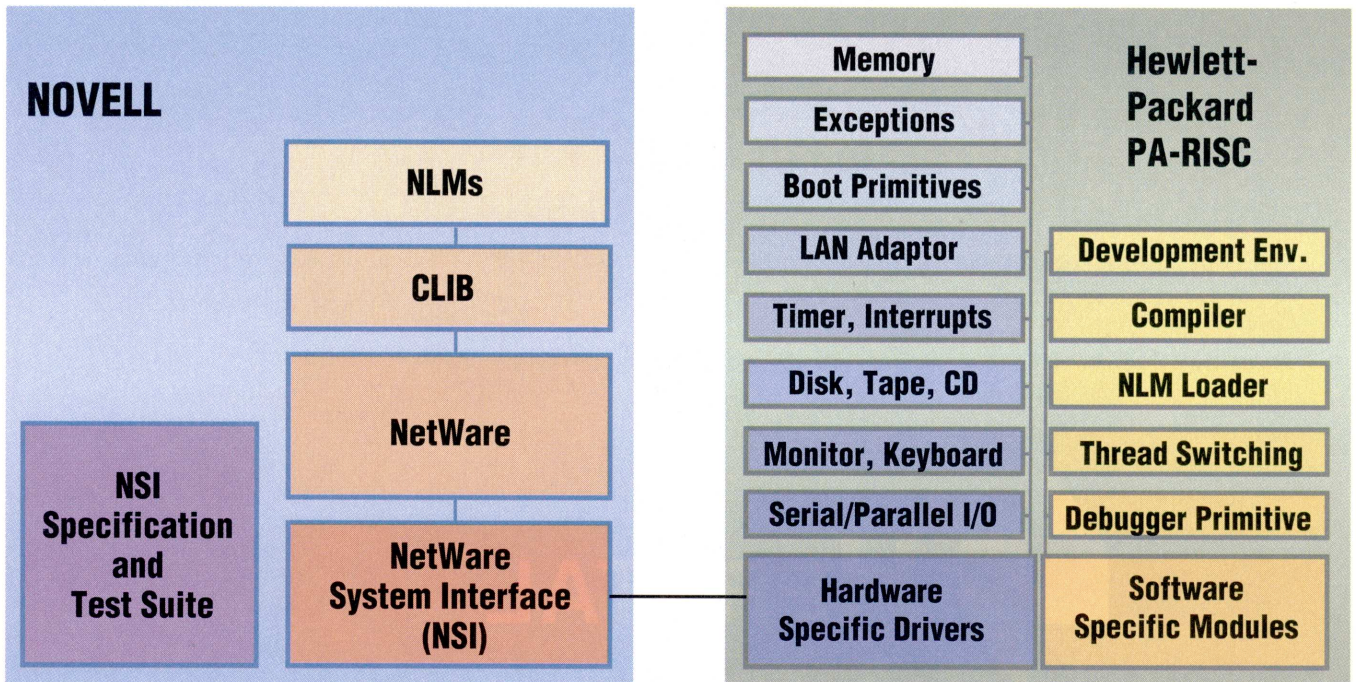
Enterprising LANs

INTERNATIONAL DATA Corp. (IDC; Framingham, Mass.) estimates that there will be an approximately 36 percent compound annual growth rate (CAGR) in the application server market (the server is dedicated to an application). By 1996, IDC estimates that the application server market will account for nearly 30 percent of all LAN server sales; file servers will account for the other 70 percent.

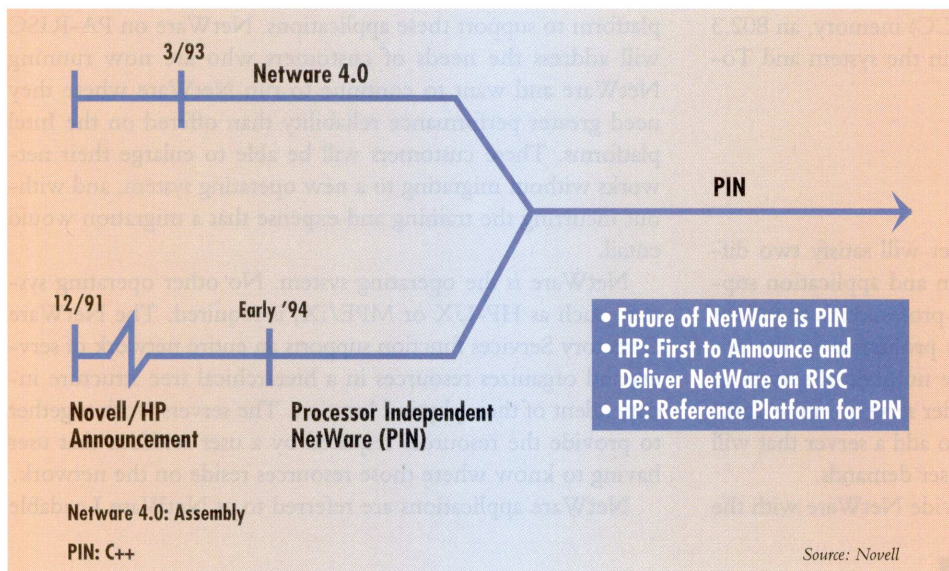
The growth is being fueled by the availability of high-end LAN operating systems with directory services, routing functionality and network management capabilities. These capabilities require an increase in overall system performance, as well as a requisite increase in memory, storage and reliability. In other words, LANs are taking on some of the mission-critical characteristics required within complex enterprise networks.

NetWare on PA-RISC will fill the gap between the file and print services usually available on Intel CPU-based servers and the multiple applications, OLTP and development tools traditionally available on mini- and mainframe computer platforms like the HP 3000 or HP 9000. For example, in the next several years, applications like database, E-mail, fax, communications (LAN-WAN gateway) and workgroup for calendaring and scheduling will play a key role in the growth of the LAN server market.

PIN Technology Architecture



Source: Novell



NetWare Evolution

mance of over 300 TPS. Designed to compete with PC servers using Intel's 66 MHz Pentium microprocessor, it can be classified as a super-server.

In most NetWare servers today, the bottleneck is in the disk I/O. Therefore, there should be two buses — one to support LAN traffic and the other to support disk I/O. The server is designed with an eight-slot EISA bus for LAN traffic, and a 100 MB bus with several slots for disk I/O.

Consequently as networks grow, companies should be able to take advantage of the NetWare on PA-RISC server's scalable and expandable features.

In addition to eight accessible front disk drive bays, and double-wide SCSI disk interfaces, memory expandable to 512

Using HP's PA-7100 CPU, the same CPU architecture used across HP's entire computer product line, the uniprocessor NetWare on PA-RISC server is expected to deliver a perfor-

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MB of error detection and correction (ECC) memory, an 802.3 Ethernet connection will be integrated in the system and Token Ring will also be supported.

Serving Two Markets

THE NETWARE ON PA-RISC server will satisfy two different market needs: server consolidation and application support. Server consolidation will enable IT professionals to reduce the support and cost required as servers proliferate in the enterprise. They will be able to reduce the number of servers in their environment, perhaps deploying older servers on the desktop, but they will also have the option to add a server that will help support expanding businesses and user demands.

NetWare on PA-RISC will now provide NetWare with the

platform to support these applications. NetWare on PA-RISC will address the needs of customers who are now running NetWare and want to continue to run NetWare where they need greater performance reliability than offered on the Intel platforms. These customers will be able to enlarge their networks without migrating to a new operating system, and without incurring the training and expense that a migration would entail.

NetWare is the operating system. No other operating system, such as HP-UX or MPE/iX, is required. The NetWare Directory Services function supports an entire network of servers and organizes resources in a hierarchical tree structure independent of their physical location. The servers work together to provide the resources required by a user without that user having to know where those resources reside on the network.

NetWare applications are referred to as NetWare Loadable

THE MISSING LINK?

An important entry into the network operating system (NOS) wars was made recently by Banyan Systems Inc. (Westboro, Mass.). With the introduction of Enterprise Network Services (ENS) for HP-UX, Banyan's ENS series (which also includes ENS for NetWare and ENS for SCO UNIX) is a marked departure from what other NOS vendors such as Microsoft and Novell are providing to their customers.

Usually, Novell and Microsoft want to provide the total solution. But when you move to their environments, you are only running LAN Manager or NetWare throughout the system. There is no provision to use legacy systems within their framework. You must rewrite and move your current applications to run on their NOS. Because of the downsizing craze of the last few years, customers were willing to be exclusive on a departmental or workgroup level. At the enterprise level, however, customers are now realizing that one solution cannot meet all their needs. There must be room to create business solutions that do not fit into any single vendor's NOS plan.

To use NOSs such as Novell on different hardware platforms, you must either use Portable NetWare or a Native NetWare port. But, both of these solutions have their limitations. Portable NetWare sits on top of an operating system and only provides file and print services to your network. The applications residing on that machine do not become available to users on the network. Native NetWare is a total replacement operating system. Your Novell server just gets larger and faster. While there are legitimate needs for those solutions, it could be just as easy to maintain the mainframe paradigm.

The Banyan ENS strategy allows customers to keep their applications and hardware platforms intact, while making them available to everyone on the network. ENS for HP-UX runs on top of HP-UX, it is not a replacement operating system. HP-UX users can now use any printer within the network, send messages to any user in the network, and most importantly, get easy

access to applications that don't reside directly on their machine. Through the use of ENS for NetWare and ENS for HP-UX, both groups of users can share applications quickly and easily while retaining the strengths of both systems.

Much of this is accomplished through StreetTalk, Banyan's Directory System. StreetTalk has always been a strength of Banyan. StreetTalk understands where users and applications are located throughout the network. This enables users to find what they need in the directory without having to know where it is physically or logically located. Network administrators can move machines, applications and users throughout the network easily. Even with the release of NetWare 4.0, Novell is still struggling to provide robust directory services on an enterprise level.

Jeff Bernard, channel manager for HP-UX at Banyan, explained that making your HP-UX-accessible applications available in the ENS network requires no application modifications. Once you define your application to the ENS for HP-UX system, it immediately becomes available for use. Banyan also has an optional developers toolkit that allows even tighter application integration with the ENS network framework.

Banyan's view of ENS is reminiscent of HP's NewWave strategy. "We don't care what you have running, we just want to be the glue to bind it all together." While HP is supporting this vision through DCE, Banyan is doing it already with their ENS product line. According to Bernard, "As the DCE specifications become available we will be able to integrate easily with it, and provide more value-added services on top of it."

Brad Askins, HP Channel Partner manager to Banyan, explained that corporations today are no longer looking at just the departmental or workgroup LAN. They are focusing on the enterprise network. Companies want to link all their various platforms together and preserve their current applications. ENS for HP-UX is a way to accomplish this.

—Tim Cahoon, Networking Editor

Modules (NLMs). HP is currently working with a number of software developers to port their NLM applications to PA-RISC. NLM applications that follow the NLM development guidelines, and do not make direct calls to the operating system or are affected by portability issues like byte alignment, will need only to be recompiled.

HP is working with vendors in the areas of database applications, document management, network management, UPS, and backup and recovery. Several companies have publicly announced that their applications will be available concurrently with NetWare on PA-RISC. These include Oracle for their Oracle7 Cooperative Server Technology database NLM, WordPerfect for their WordPerfect Office NLM and Cheyenne Software for their ARCServe NLM backup and restore software solution.

The HP and Novell relationship provides many benefits to customers who wish to go beyond LAN file and printer sharing, while those moving into client-server computing can continue to use the familiar Novell NetWare environment. For example applications, such as databases scale with the processor and will be able to support a greater number of users than on an Intel platform. Database applications can replicate sections of a central database and download the information from

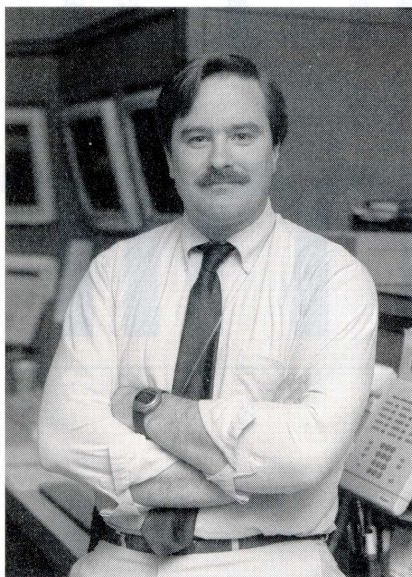
NetWare is the operating system. No other operating system, such as HP-UX or MPE/iX, is required.

a LAN server, thereby off-loading the central server. Because HP recognizes the importance of industry standard hardware and software within LAN environments, the NetWare on PA-RISC Server will support EISA, SCSI and Ethernet interfaces. As HP introduces new processors, NetWare on PA-RISC will benefit from their increased performance. —Rosemary DeVere is HP's channel manager for NetWare.

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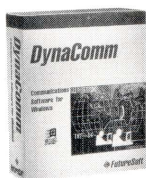
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UX System Installation

UNIX system administration has often intimidated non-UNIX system administrators. However, because of HP's strong emphasis on commercial UNIX, much of the functionality found in proprietary operating systems is now available on HP-UX. These include production scheduling, application optimization, performance diagnostics, output spooling, workload management, archival management, fault management and high availability.

Marty Poniatowski



Most routine HP-UX system administration tasks can be performed using the System Administration Manager (SAM).

But what about basic HP-UX system administration? UNIX was originally designed to sit on the desk of a scientist or engi-

A GRAND PERFORMANCE

Performance monitoring and tuning are becoming increasingly important in all types of HP-UX installations including centralized, commercial-oriented installations as well as widely-distributed installations.

Several HP-UX commands give you a quick look at what is taking place on your system:

iostat to get input/output statistics on devices such as disks and terminals, as well as a CPU utilization.

vmstat to get virtual memory statistics and CPU utilization.

netstat to get network statistics.

ps to get a list of processes and information on each process.

These commands produce snapshot results, but you don't get much information over an extended period of time. If you want or need to get more information about your system over a period of a day to a month, enable HP-UX accounting. At the end of each day and month, an accounting report is produced which provides the amount of system resources each user and application is consuming.

neer who needed all of his or her intellect just to add a printer. Now, however, improvements have been made in routine system administration on HP-UX. Most routine HP-UX system administration tasks can be performed using the System Administration Manager (SAM). *Figure 1* is the top level menu of SAM and shows the categories of system administration you can control.

What's On the Menu?

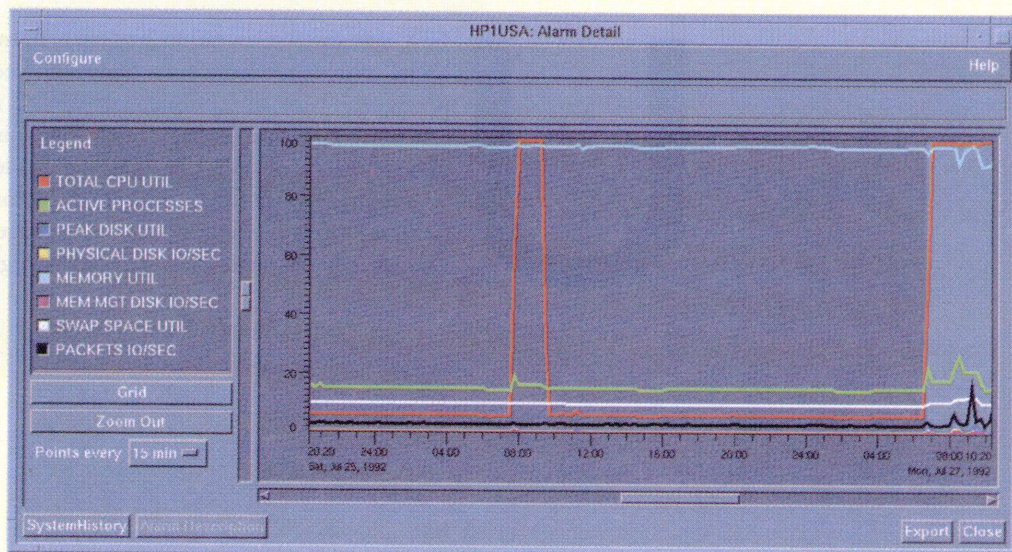
KEEP IN MIND, HOWEVER, that these are primarily routine tasks. If you need to perform work in one of the HP-UX systems management services areas, such as archival management, you would use an interface provided by the application vendor.

For example, you can use SAM to help manage your disks and file systems by selecting the "Disks and File Systems" on

To take the analysis of your system beyond built-in HP-UX commands and built-in accounting, you can use some add-on products to assist you further. Two tools used in HP-UX installations are HP GlancePlus and HP PerfView.

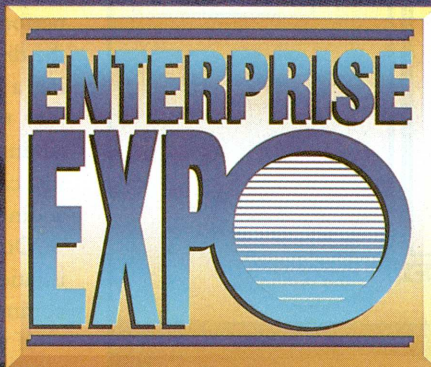
GlancePlus is a real-time performance monitoring and diagnostic tool. GlancePlus provides functionality that is far better than using the HP-UX commands and accounting. For instance, with GlancePlus you can graphically display the amount of CPU, memory, disk and network being consumed on your system. You also can get information on specific processes.

HP PerfView is used to centrally manage system performance in a distributed computing environment. If you have a large network of systems then PerfView is the performance tool for you. *Figure 4* shows a PerfView alarm screen showing activity on a specific system at the time an alarm occurred.



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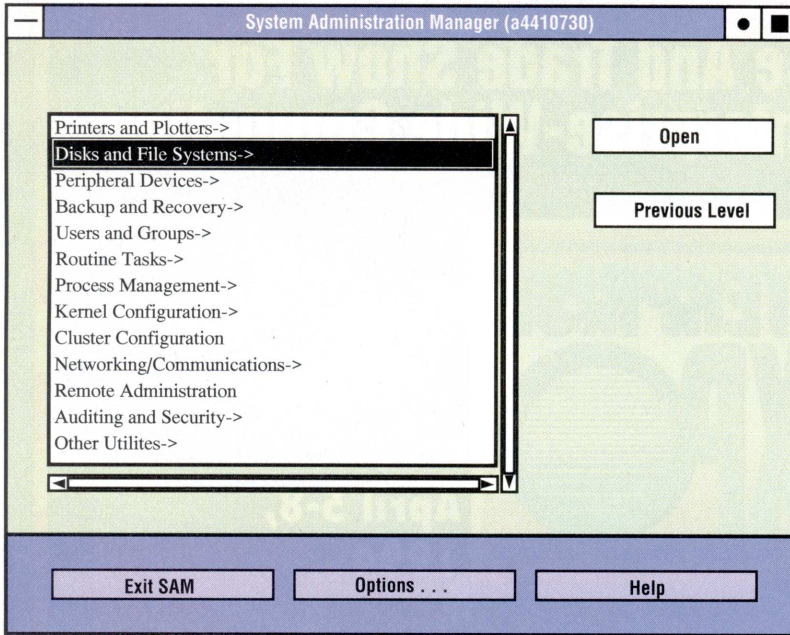


FIGURE 1

To add a disk using SAM, you would use the actions menu and fill in the appropriate dialog boxes. To manually add a disk you would have to perform such tasks as creating the device files for the disk, initializing the disk with **mediainit**, making a file system with **newfs**, creating the directory to act as the mount point for the disk and adding an entry to the `/etc/checklist` file to automatically mount the filesystem at boot. SAM makes adding a disk significantly easier.

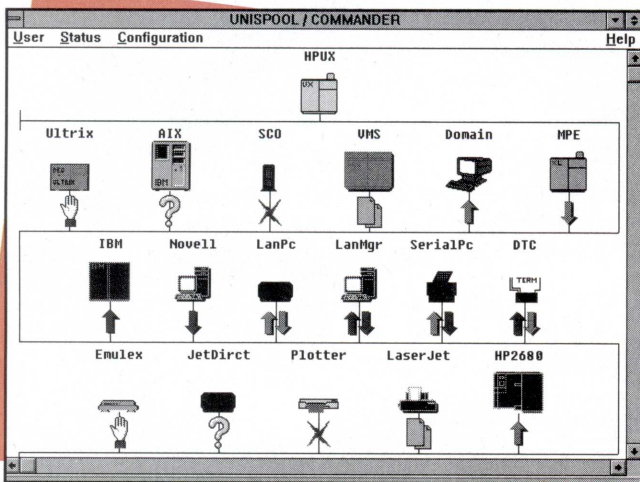
Does using SAM mean HP-UX system administration is now a cookbook set of routines and the command line is not required? No.

If you use SAM to add a disk, and you aren't sure of the effect this will have on the HP-UX system, then simply don't use SAM. SAM makes performing routine tasks quicker and easier; it is not

the menu. Figure 2 shows what you see when you select that menu, including a window that describes the tasks you can perform.

a substitute for the knowledge a system administrator should and must have, although there is a lot of uncertainty regarding what specific HP-UX knowledge is required. Usually, system

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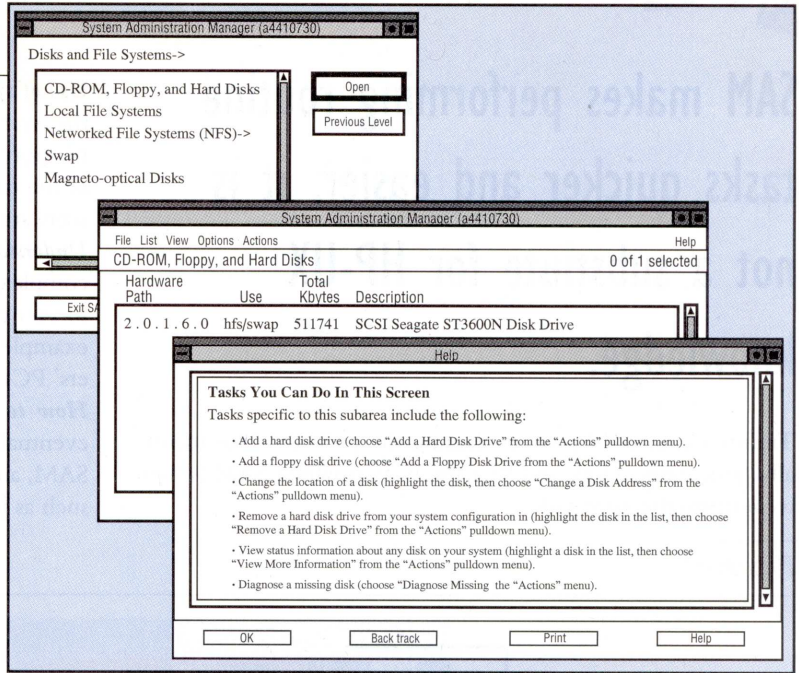
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FIGURE 2

administrators who have knowledge in the following areas have their installations under control and can address new projects with confidence:

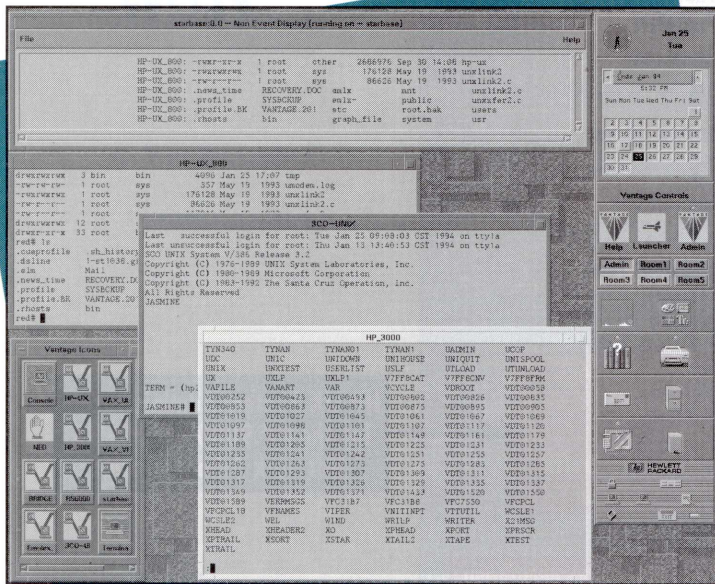
HP-UX system set-up — Setting up a system is usually a one-time deal. During this process you'll be exposed to configuring hardware, loading HP-UX and other software, configuring peripherals, setting up networking files and developing the backup scheme. Even if HP is performing much of the set-up for you, be sure to participate in the process as much as possible. Figure 3 details the steps required to set-up an HP-UX system.

In addition to the system set-up steps, Figure 3 lists some recommended HP training courses. The courses required to perform HP-UX system administration vary, but all are useful. Some system administrators like to take all training courses before working on the system, others like to spread out the training. Remember, it is always possible to refer back to the training material to refresh your memory.



Use of SAM — SAM is good for many activities, but as stated earlier, understand how to manually perform the tasks SAM is handling before letting SAM make the changes to the system.

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SAM makes performing routine tasks quicker and easier; it is not a substitute for HP-UX knowledge.

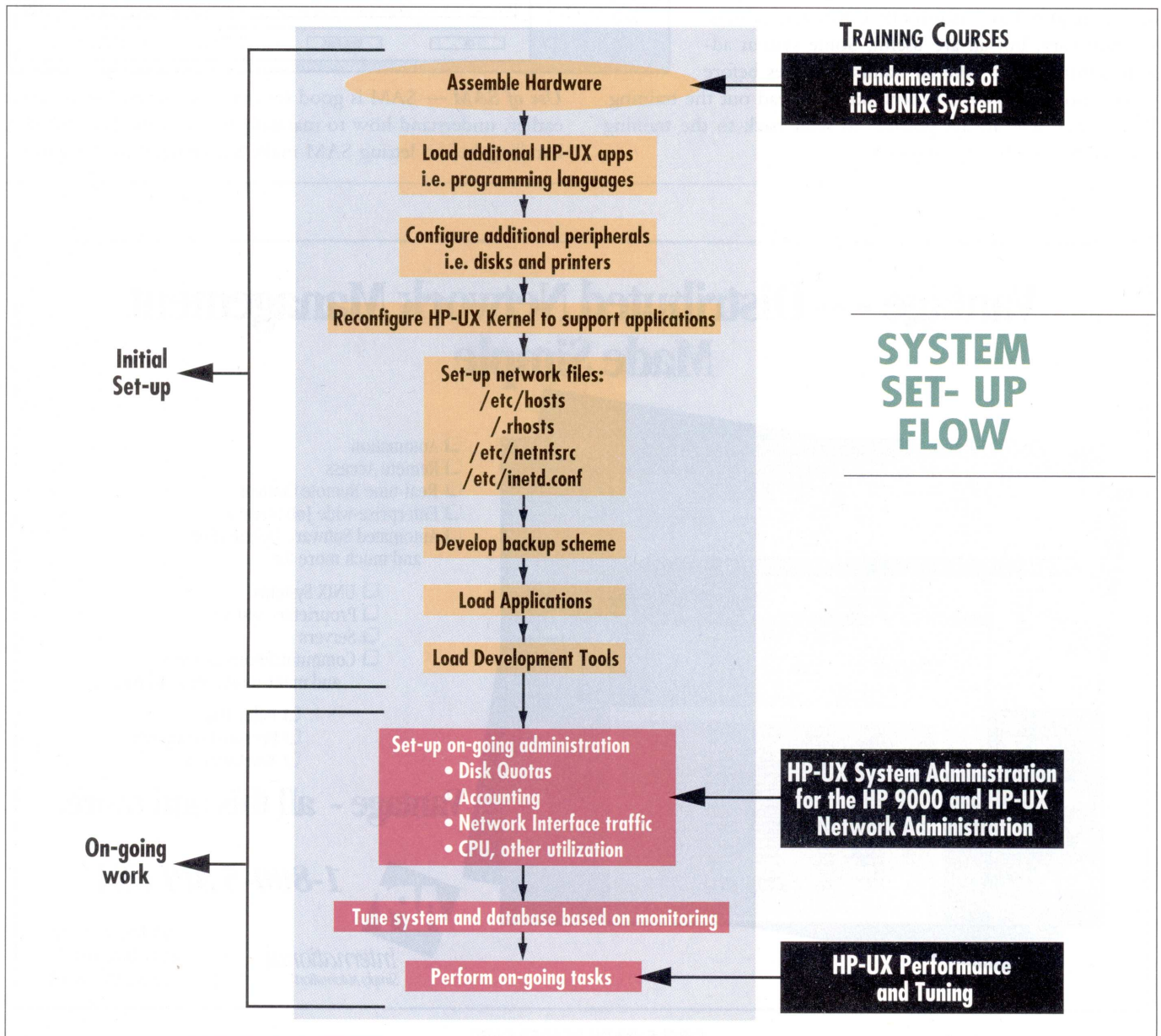
Training courses help by explaining the procedure for manually performing a task and later the way in which SAM is used to perform the same task.

Use of system resources — An administrator should understand the system's profile, including how much of your CPU, memory, disk and networking are being used at various times of the day. It also means understanding which applications and users are the "hogs" on your system.

Understand the user interface — Windowing environments are complex but you still need to have an understanding of them so you can make informed system management decisions. For example, HP VUE or X Window System software on the users' PCs will have a significant impact on your system.

How to write shell programs — Every system administrator eventually writes shell programs. With advanced tools such as SAM, and third-party products that help with sophisticated tasks such as job scheduling, it might seem that the high-level inter-

FIGURE 3



faces of these tools would obviate the need for writing custom shell programs. But nothing could be further from the truth.

It's not long before every system administrator finds some redundant task that could be performed in a fraction of the time with a shell program. It takes a little time and effort to become a proficient shell programmer, but with a good shell programming book and few examples to work from, most system administrators find this to be a skill well worth mastering.

Gaining knowledge in all these areas comes in many different ways. The first, is to participate in the set-up of the system. Or, at least know what has taken place if it is being done for you. Then, make whatever changes you need to make, such as adding a disk or changing the group that a user is in. This will build confidence in your HP-UX system administration skills.

The second way is through training with courses available through HP or third-parties. Although it may be difficult to get out of the office, training will give you the confidence you need when you have to make necessary changes to your system. —Marty Poniatowski is a technical consultant for Hewlett-Packard in Stamford, Conn. He is the author of "The HP-UX System

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RISC Management

HP saw the benefits of RISC CPU architectures

long before it became evident to its competitors in the computer business. RISC architectures, of course, follow the premise that a central processor with a small number of highly optimized instructions is more efficient than a traditional CISC processor-based system. In 1988, HP bet its future on its RISC processor family, known as Precision Architecture (PA).

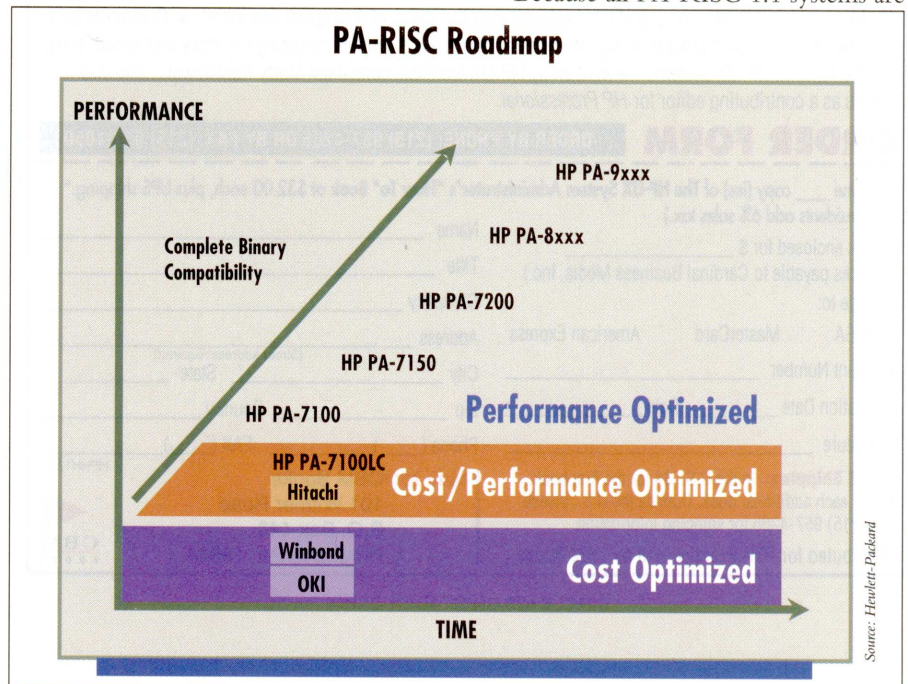
HP-PA 1.0 was the original architecture for the first HP 9000 Series 800

systems. But in 1990, with the introduction of the HP 9000 Series 700 workstations, HP implemented HP-PA 1.1 on the PA7100 CPU. Shortly thereafter, HP put the same combination into the HP 9000 Series 800 systems — the 8x7 product line. Since then, all new HP systems that have been introduced use the HP-PA 1.1/PA7100 architecture now better known as PA-RISC.

Besides a few enhancements in integer arithmetic, PA-RISC 1.1 includes:

- 16 additional floating-point registers
- the ability to address each double-precision floating-point register as two single-precision registers
- some new floating-point operations which greatly improves floating point calculations.

Because all PA-RISC 1.1 systems are



backwards-compatible with PA-RISC 1.0, all programs compiled on a system that uses PA-RISC 1.0 will execute without change on a PA-RISC 1.1 system.

If you compile a program on an HP 9000 Series 700 machine, the compiler will generate PA-RISC 1.1 code by default, and the executable will run only on a PA-RISC 1.1 system. The first HP 9000 Series 800 systems will generate PA-RISC 1.0 code, but you can use the resulting executables on any PA-RISC system.

If you are developing on an PA-RISC 1.1 system, you can still force the compiler to generate PA-RISC 1.0 code using the +DA compiler option. However, you need to be sure that you do not link any object libraries that were compiled for PA-RISC 1.1. If any module in a program is compiled for PA-RISC 1.1, the entire program is marked as a PA-RISC 1.1 program. Use the "file" command to discover if you have successfully compiled an HP-PA 1.0 executable.

Fortunately, most system archive libraries that HP ships are compiled for HP-

PA 1.0; although math libraries are shipped in both versions. **Note:** the new version, found in /lib/pa1.1, has entry points that aren't available in earlier versions.

When compiling software for compatibility across platforms, the operating system version is critical. So, when you compile your code on a PA-RISC 1.1 system, and use the +DA 1.0 flag, your software will run on PA-RISC 1.0 or 1.1 systems running the same or later version of HP-UX. For example, if you compile code on HP-UX 8.0, you can expect the code to run on HP-PA system running HP-UX 8.0 or HP-UX 9.0; however, it won't run on an HP-UX 7.0 system.

You can use the +DS scheduling option without affecting the compatibility of your object code. This option only affects how the compiler optimizer schedules instructions which have long execution latencies, so it is probably to your advantage to schedule the code for the fastest machine, even if you are generating HP-PA 1.0 code.

What does all of this mean? Well, if

you are developing code that must run on a number of different HP systems, it means you should use the +DA 1.0 compiler flag, and use a version of HP-UX that is the same release or older than your customers will have. This may force you to stick with HP-UX 8.0, but it will let your customers and prospects use your code no matter what system you use as your development environment.

PA-RISC continues to evolve as evidenced by the new PA7100LC CPU introduced in December 1993. The 7100LC CPU maintains full PA-RISC 1.1 functionality while adding 48 bit addressing, little endian capability, uncachable memory pages and multimedia support. While it was far from a sure thing when HP started, PA-RISC has proved to be reliable, flexible and scalable.

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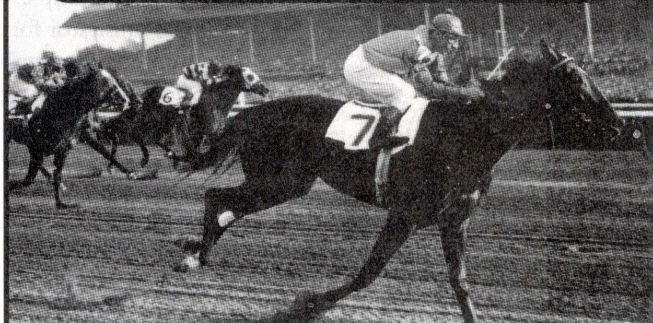
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Playing Peek-A-Boo With E-mail

Technology advances can bridge oceans of business demands,

however, the moral and legal implications of such advances can leave you in a quagmire that takes years to cross. Take E-mail and workplace privacy, for example. This concerns not only your company management, but should concern you as a system mail administrator.

For example, several years ago a mail administrator for a major computer vendor was apparently fired for protesting the actions of a manager who was reading and copying employee E-mail. That was after assuring over 700 employees of their E-mail privacy based on assurances she had received from management. The company claimed the mail administrator was fired for insubordination.

A class-action suit was also filed on behalf of all those employees whose mail was read. The case was filed under a California State statute that prohibits the interception of any electronic communications without the consent of all parties. The judge accepted the defendants arguments that the law did not cover electronic mail or the workplace. The case is currently being appealed.

The basis for bringing this case to court stemmed from the perception that E-mail is entitled to the same legal and ethical standards that govern the United States Postal System. A user expects that everything he writes and sends will remain

private. But is that a reasonable expectation given current technology, legal statutes and the business needs of a corporation?

The Electronic Communications Privacy Act of 1986 was enacted to prohibit computer eavesdropping; excepting cases in which the authorities can prove that a crime may be occurring. This law, however, only protects the communications between companies. Internal corporate E-mail is currently regarded in the courts as commercial communication. According to Walter Ulrich, a director at the Arthur D. Little consulting firm and an E-mail issue specialist, this is a category to which the First Amendment rights of free speech do not extend. This gives corporations every right to view the files on a hard disk and every E-mail message that passes through its system. But, is this an ethical practice?

Management assumes the right to view any information stored in the office computer systems. They purchased the equipment, trained the users and they pay the communications costs. They have a right to make sure that the equipment is being used for legitimate business purposes. You should understand that in the case of your absence, your supervisor or even a co-worker may need, and get, access to your files or mail messages in order to carry out the daily business.

As an employee, however, you appreciate the privacy of your own work. You don't want others interfering with it. As long as you are doing your job satisfactorily, everyone should leave you alone. You also may have used the computer for some non-business function, preparing your income taxes or exchanging personal

messages with someone in the next building.

As an E-mail system administrator, you have other concerns. On occasion, messages get stuck in gateways, and they require someone to push them on their way. There are times you may see the contents of private messages. You also need to control the amount of disk space used by E-mail on the network. How do you purge the old messages users leave in their mail directories? Backups store mail messages off-line for months and can be used for evidence in legal proceedings. How do you do your job without creating ethical problems, yet still provide the users with the service they require? What do you do if someone is reading another user's E-mail for business reasons, or sending inappropriate messages through the network?

The answer to all these questions are not found in technology, but rather in administrative policy. A policy created by

Find out how paper
records and files are
treated, and apply those
policies to their electronic
counterparts.

management, human resources, legal counsel and users should be developed on the subject of workplace privacy. While this column is focusing on E-mail and disk files, you also need to cover paper and telephone privacy issues at the same time.

Of the companies responding to a recent ZiffNet survey, over 76 percent did not have or were unaware of any policies regarding privacy in the workplace. Areas covered by those who had policies included: monitoring and reading of E-mail; monitoring and listening to telephone calls; monitoring of voicemail; access to files on employees' hard disks; monitoring keystrokes; and monitoring

user activity on the network. In today's world, this majority is not the one to be in.

Establishing a policy should be fairly simple to accomplish. William Morony, executive director of the Electronic Mail Association (EMA; Arlington, Va.), states that establishing a policy is not rocket science. He suggests figuring out how paper records and files are treated, and then applying the same policies to their electronic counterparts. Privacy policies should cover all areas including the following: computer files, E-mail, voicemail and telephone usage. Make it simple to understand. Common sense and courtesy makes the best guidelines.

A good policy establishes trust between employees and management, and sets employee expectations. Employees need to understand that E-mail is not completely private — mail administrators may see their message in the course of keeping the mail system running. It also should be understood that mail is transmitted in clear text. While it is unlikely anyone would actually read it, the possibility exists. A good policy assures the employees that management or other employees will not be getting into their communications without a business need. Such policies also provide guidance to you as mail administrator in the duties you need to perform to keep the system running.

To help companies establish policies on workplace privacy, EMA offers a *Tool Kit for Formulating Your Company's Policy*. The *Tool Kit* is available for \$40 to non-members and \$20 to EMA members.

Another organization that is helping define the legal morass of cyberspace is the Electronic Frontier Foundation (EFF). The EFF was started by Mitchell Kapor, founder of Lotus Development Corp., and Grateful Dead lyricist John Perry Barlow to support those using computers and computer networks. They are in the business of making sure electronic communications are not unduly restricted due to the public's fear of the unknown.

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Answers At The Speed Of Light

This is about a tool that has been receiving far too little attention.

In today's rapidly changing computing environment, HP LaserROM/PC is essential for system managers, developers and programmers working with HP 3000 systems.

HP LaserROM/PC, when combined with HP documentation on CD-ROM, is a powerful yet intuitive tool for managing HP 3000 systems. Its browse and keyword search capabilities provide the information you need, when you need it. HP LaserROM/PC B.00.00, released in late 1993, has a completely redesigned interface. It has a new customized bookshelf feature allowing you to group frequently used manuals and new navigational tools including tables of contents, hyperlinks and indexes.

According to Steve Stukenborg, product manager with the Software Services and Technology Division at HP, only about 25 percent of MPE/iX systems on support contract are receiving documentation on CD-ROM. This percentage should be much higher.

HP documentation on CD-ROM is less expensive, more timely, more complete and takes up dramatically less space than traditional paper documentation. One CD-ROM disc holds the entire MPE/V or MPE/iX document set, including manuals, software status bulletins,

application notes, product catalogs, solutions catalogs and Communicators. No more need to bother with paper manual updates and the hassle of interleaving new and revised pages into your binders because each disc is a complete replacement for the previous disc. When you get a new disc, just toss the old one into the trash.

Manuals are referred to as "books" and bulletins and notes are referred to as "documents" by HP LaserROM/PC. There are some differences in the way books and documents are handled, but the important thing to note is that HP LaserROM/PC is a full-text keyword retrieval system. Every significant word in a book or document is indexed for rapid retrieval.

HP LaserROM/PC's search facility handles everything from simple keyword retrieval to complex boolean combinations, keyword proximity, thesaurus equivalents, wildcard keyword expansion and publication date ranges. For example, the search criteria: **"byte array"** and **"bounds violation"** will find all instances where the phrases "byte array" and "bounds violation" appear in the text within 100 characters of each other.

IN SEARCH OF

I recently had several opportunities to test out the search capabilities of HP LaserROM/PC. One of my duties involves maintaining a large number of SPL programs from the late '70s and early '80s. I/O is handled with direct calls to system intrinsics such as FREAD and FWRITE. The syntax of these intrinsics specifies logical arrays for the target strings. If, instead, you pass a byte array, SPL issues a warning message during the compile,

"arithmetic right shift emitted" and converts the address by shifting it one bit to the right. The tendency is to ignore the warning and, in the vast majority of cases, the compiled program will run just fine. This is what the author of these SPL programs chose: ignore the warning.

The warning does not tell you, however, that if the data stack expands beyond 16K and the byte array falls above the 16K point (as could easily happen with a byte array local to a procedure), the one bit shift can cause the wrong half bank of memory to be addressed, possibly resulting in the process aborting with a bounds violation. I've known about this idiosyncrasy for many years but didn't know if or where it was documented.

Recently, after enhancing one of these old programs, it failed with a bounds violation in a section of code not involved in the enhancement. After tracking down the location of the bounds violation to an FREAD with one of those "arithmetic right shift" warnings, I suspected this might be an example of the address conversion problem. Sure enough, it was.

However, I wondered if this was documented anywhere and what I would have done if I had not already known the answer. I called up HP LaserROM/PC with the MPE/V disc loaded and executed a search on all documentation (manuals, SSB, etc.) for the combination of "byte array" and "bounds violation." In less than two minutes, it found three occurrences. The first (in the Syntax section of the MPE/V Intrinsics manual) described the exact problem. I doubt I would have found this without HP LaserROM/PC.

Another example involved a question from a friend about how to call the CREATEPROCESS intrinsic from a COBOL program; in particular, how to pass the address of a COBOL variable to CREATEPROCESS. My friend thought it might be necessary to write a subprogram in some other language that could handle addresses to actually make the intrinsic call. Though I try to avoid COBOL, I assured him that there was now a way to directly pass an address to an intrinsic from COBOL - I just couldn't remember it. I cranked up HP LaserROM/PC and after a few false starts while I tried to come up with the right

search criteria, I found the answer and was able to direct my friend to the exact section in the appropriate manual.

EXPERIENCE COUNTS

HP LaserROM/PC is not a substitute for experience. To use it properly, you need to know enough to construct a search request that is sufficiently precise to qualify

a manageable number of occurrences yet broad enough to qualify the information you are looking for. HP LaserROM/PC can make use of a thesaurus to handle common variations on a token, but experience is still an essential ingredient for a successful search.

The minimum requirements for the HP LaserROM/PC version B.00.00 are

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Microsoft Windows 3.1 on top of MS-DOS 5.0 running on a 386 PC with 4 MB of RAM, a VGA monitor, 4 MB of available hard disk storage, a mouse and any ISO 9660-compatible CD-ROM drive. I used a 386SX machine with 5 MB of RAM, a Panasonic double-speed CD-ROM drive and a bus mouse. Except for graphics images, performance was excellent.

HP LaserROM/PC does have a couple of shortcomings. Heading the list is the way it counts matches. In my first example, the search criteria was "byte array" and "bounds violation." I would call a single instance of the two phrases appearing within the configured proximity (default 100 characters), one match. Instead, HP LaserROM/PC reports it as four matches. This makes no sense.

The promotional brochure says "printing is a snap," which is correct — to a point. It only takes a small amount of mouse movement to send text to a printer;

however, it is another story entirely to get the print to fit properly on a page if you don't have an HP LaserJet printer. While you have a choice of fonts for the screen, the choice is not carried over for printing.

Finally, the lack of horizontal scrolling in the search scope and results windows is a nuisance. For example, if the search scope includes the Communicators, the results window will display the titles of the articles. It is often difficult to determine the topic of an article from just the first few words. You can open up a document to determine if it is relevant or you can resize the window to display more of the title; however, HP LaserROM/PC does not remember your window size preferences for later sessions once you exit.

ADDING IT ALL UP

What does it all cost? Assuming you already have an adequate PC with Windows 3.1, expect to pay around \$300 for a CD-ROM drive and interface card

(more to have it installed, but probably worth it unless you love frustration). A single-user version of HP LaserROM/PC costs \$275 (\$695 for an additional 8-user license). The CD-ROM subscription service is \$46 per month if you already have a support contract and \$95 per month otherwise.

Even with its faults, HP LaserROM/PC still saves trees, shelf space and makes the job of system management much easier. With Release 5.0 of MPE/iX, it gets even better, because a system CD-ROM drive can be used for the dual functions of software updates and documentation access via HP LaserROM/PC. Now, if we could just get all HP 3000 publications on CD-ROM ...

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Informatica Announces RightSmart Toolkit

Informatica Corp. announced the availability of RightSmart, a Microsoft Windows-based toolkit that accelerates the migration of data in legacy systems to distributed client-server environments.

RightSmart automates tasks usually performed manually, allowing IS departments to focus on higher-level design and development issues.

It consists of three components: COBOL Analyzer, which captures information about data definitions from the source code of an application; Database Designer, which allows users to modify data definitions graphically, and automatically creates relational database tables; and Data Loader, which loads existing data by mapping legacy data structures to the relational database tables.

RightSmart analyzes ANSI 74, ANSI 85 and the Micro Focus and IBM mainframe versions of COBOL. It works with RDBMSs from Oracle, Gupta and Sybase, and other databases that support Microsoft's Open Database Connectivity (ODBC) Interface.

Price is \$3,495 for a single-user license. Contact Informatica Corp., 11925 Wilshire Blvd., Third Floor, Los Angeles, CA 90025; (310) 479-4601.

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Comtec Automated Adds NetWorker For HP 9000

Comtec Automated Solutions (CAS) added the NetWorker version for HP to its backup software product line. NetWorker supports both tape and optical storage as backup media.

This software is combined by CAS with a variety of tape and optical hardware, along with pre-sales consulting, installation, post-sales training and on-going technical support. NetWorker software allows users to backup across a heterogeneous mix of workstations. NetWorker uses a client-server architecture

to provide network-wide backup and recovery capabilities. Heterogeneous clients are easily added to the NetWorker server without changes to the server software. Modifications made to the server are transparent to the clients.

Contact CAS, 10,000 Old Katy Rd., Ste. 150, Houston, TX 77055; (713) 935-3666.

Circle 374 on reader card

TEAMWORK Releases Motif Made Simple V1.0

TEAMWORK Software Solutions released Motif Made Simple Version 1.0 (MMS). MMS lets software developers generate Motif X window system forms-based applications without the use of complex Motif and X window programming concepts and libraries.

MMS is a library of C program routines that shorten development cycles by allowing developers to focus on the solution to a problem and avoid prolonged X window training and development. Using MMS, a programmer with basic C programming skills and basic experience with a windowing environment (X, Windows, Macintosh) can develop sophisticated X window applications with minimal effort.

MMS is available in object library and source code for the HP 9000 and Sun SPARC platforms. Prices vary with the type of licensing option.

Contact TEAMWORK Software Solutions, 572 E. 126th Terrace, Ste. 1B, Olathe, KS 66061; (913) 829-5128.

Circle 372 on reader card

SCH Offers Scalability For HP OpenView

Software Clearing House (SCH) announced that Version 1.20 of OS/EYE*NODE will provide significant scalability and distribution for HP OpenView, IBM NetView 6000 and DEC PolyCenter NetView. OS/EYE*NODE from Digital Analysis Corp. (DAC) will be ported to HP, Sun, IBM, DEC and DG systems.

OS/EYE*NODE achieves scalability through distributed domain-level managers called Network Slate*Machines (NSM) and numerous specialized resource managers called proxies. Each NSM can autonomously detect faults, take remedial action and notify one or more remote OpenView consoles. NSMs can manage one or more domains consisting of 20 to 2,000 SNMP or CMIP manageable resources. NSMs also can be incrementally deployed to scale from a single NSM to thousands of NSMs, addressing management capacities of hundreds of thousands of devices or resources over an arbitrarily broad geographical area.

Distribution is achieved via a distributed domain-based hierarchical map called Domain*View and Node*View. OS/EYE*NODE is a standards-based solution that is hardware, software and database independent.

Contact SCH, 3 Centennial Plaza, 895 Central Ave., Cincinnati, OH 45202; (513) 579-0455.

Circle 400 on reader card

Abacus Data Systems Unveils Version 6.4

Abacus Data Systems Inc. released version 6.4 of its ADAMS 4GL software. With an emphasis on customer service, the basic solutions are integrated to improve the management of sale order processing, inventory, purchasing and accounting.

ADAMS 4GL is a highly comprehensive business management system that can handle the needs of large and small operations. Some of the customer service features include the ability to cross and up sell, add complimentary items, order by customers' part numbers, order from customer history and reserve inventory for a customer. Other highlights include pricing by customer, online order entry, powerful search and inquiry capabilities, and extensive customer default setups.

ADAMS 4GL is written in Progress in a

relational database system and runs on HP 9000 Series 800 systems.

Contact Abacus Data Systems, 3601 Algonquin Rd., Rolling Meadows, IL 60008; (708) 632-0303.

Circle 399 on reader card

Kearny Systems Expands Barware Software Line

Kearny Systems Inc. (KSI) announced that it has expanded its line of Barware software products to operate on HP and DEC OSF UNIX platforms, using Oracle as the database management program.

KSI also has formed a strategic partnership with Vertex Industries to integrate Barware products with Vertex's Bridge.Net software for data collection. Bridge.Net is an advanced data collection management system which can operate in UNIX, DOS and AS/400 environments.

KSI released its Electronic WAREhouse Locator System (EWARE LS). The EWARE LS program provides total automation to warehouses, distribution centers and industrial facilities. EWARE LS also provides a real-time, LAN-based solution to receiving, put-away, storage, product movement, picking, verification, shipping and freight problems through radio frequency (RF) transactions. The EWARE LS program may be interfaced directly to an existing host computer, or may be used as a standalone, independent network. An optional EDI module provides integration into an existing EDI program or can provide a total EDI program within EWARE LS.

Contact Kearny Systems Inc., 604 Courtland St., Ste. 180, Orlando, FL 32804; (407) 740-5220.

Circle 397 on reader card

Leading Technology Releases Metrica 4.0

Leading Technology Inc. (LTI) released Metrica Version 4.0. Metrica is an engineering toolkit with unified data management, analysis and visualization functionality. Metrica is used by engineers in data-intensive environments in aerospace, automotive, telecommunications, semiconductor and defense industries.

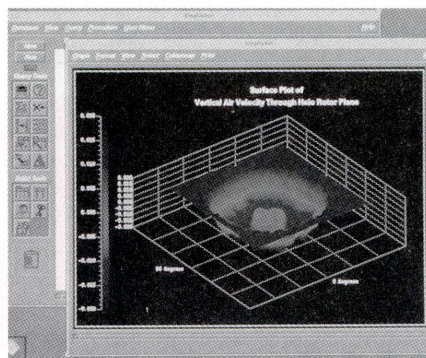
Release 4.0 provides features to store, manipulate and graph large volumes of engineering data from specialized test and measurement applications.

Database server enhancements include BLOB support, multidimensional array support and performance improvement. Visualization enhancements include new engineering graphs and there are also configurable GUI tools.

Metrica 4.0 is available on HP, Sun, DEC Ultrix, IBM and Silicon Graphics workstations. Pricing starts at \$6,126 per seat for a 4-user system.

Contact Leading Technology Inc., 6 New England Executive Park, Ste. 400, Burlington, MA 02803; (617) 229-8686.

Circle 396 on reader card



Metrica 4.0 is accessible through an intuitive GUI.

Cincom Announces XpertRule Version 2.1

Cincom Systems Inc. announced the availability of XpertRule Version 2.1 with enhanced graphical knowledge capture capabilities, refined source code generators and new forms-based end-user facilities.

XpertRule is a Microsoft Windows-based knowledge specification and application generation system that allows users to quickly develop, prototype and refine applications requiring complex decision processes. It automates knowledge capture using learning-by-example techniques, and represents it graphically as pattern rules, decisions and exception trees, and truth tables.

XpertRule can run standalone on a PC, and also generates program source code in COBOL, C, Pascal and MANTIS for development to other systems. XpertRule MANTIS applications are fully portable and can be deployed to a number of systems including HP, IBM MVS, VSE and VM, Sun, SCO and other UNIX systems, DEC Open VMS and OSF/1, DOS and OS/2.

XpertRule on Windows cost \$990.

Contact Cincom Systems Inc., 2300 Montana Ave, Cincinnati, OH 45211-3899; (513) 662-2300.

Circle 394 on reader card

RAC Consulting Adds ESPUL-PRINTPATH Family

RAC Consulting announced additions to its ESPUL-PRINTPATH family of HP 3000-based network printing solutions.

PRINTPATH/NLM is an HP 3000-to-Novell print gateway that runs as a NetWare Loadable Module (NLM) on the Novell server. It spools HP 3000 print files to Novell print queues automatically. It also prints to and from UNIX systems via the LPD protocol, and prints from the Novell server to TCP/IP printer interface cards.

PRINTPATH/UNIX implements the UNIX Line Printer Daemon (LPD) remote printing protocol on the HP 3000. Using this product, the HP 3000 can send and receive print files as if it were another UNIX host.

PRINTPATH/SE is a standalone edition of the ESPUL-PRINTPATH family of network printing solutions for the HP 3000 that does not require the full ESPUL spoolfile management package from RAC.

Contact RAC Consulting, P.O. Box 10099, Olympia, WA 98502; (206) 357-9572.

Circle 390 on reader card

Root Group Inc. Develops PC-Rshell

The Root Group Inc. developed PC-Rshell, the missing link in PC networking. PC-Rshell creates a true peer-to-peer, multi-platform networking environment. Running on top of a TCP/IP network, PC-Rshell is a tool for distributed management that allows remote shells to be run on the PC. It enables a systems administrator to initiate incremental backups, software upgrades, virus scans and audits for software, hardware, memory and network configurations from the host on any platform on the network or arbitrary groups of PCs on the network.

Using PC-Rshell and its remote PC access allows execution of most DOS and Windows commands from anywhere on the network making PC files available to the entire network.

PC-Rshell's network security capabilities control access by defining any combination of parameters such as who, where, what and when. Total password protection protects against unauthorized changes to access control parameters.

PC-Rshell supports PC-NFS 4.0a and 5.0 and all other TCP/IP stacks that support Windows sockets DLL 1.1; UNIX platforms including HP-UX, Solaris 1.x, 2.x, DEC Ultrix, SCO UNIX and Intergraph CLIX; networks with 386 or 486 IBM PC or compatibles with 2 MB RAM, MS-DOS 5.0 or 6.0, Microsoft Windows 3.1 in 386 enhanced mode, one UNIX workstation and an Ethernet.

Contact The Root Group, 4700 Walnut St., Ste. 110, Boulder, CO 80301; (303) 447-3938.

Circle 389 on reader card

Reflection I For Windows Includes HP ANSI Emulation

Walker Richer & Quinn Inc. (WRQ) shipped Reflection 1 for Windows which features HP ANSI emulation.

Version 4.1, is for users who need VT emulation in an HP 3000 environment. The HP ANSI emulation (VT220, VT102, VT52) will enable users to run host applications such as UDM and Oracle.

For systems administrators, this version will offer the ability to limit user access to Reflection features. This will prevent users from changing the way Reflection is configured.

Other features include Windows Sockets-compatible Telnet; support for additional HP 700/94 terminal features; graphical interface for keyboard mapping; floating host keyboard; Zmodem support; and Reflection FTP.

Contact WRQ, 2815 Eastlake Ave., E., Seattle, WA 98102; (206) 726-7237.

Circle 388 on reader card

SES Generates C++ Code Frames

SES introduced SES/objectbench Frame Builder, a CASE tool that automates the task of creating syntactically correct C++ code frames.

By generating a set of C++ code frames directly from the Shlaer-Mellor OOA models, SES/objectbench Frame Builder eliminates the time-consuming task of implementing this phase of development process by hand.

Other SES/objectbench tools include a Graphical Modeler for building models, and an Animated Simulator for testing and verifying model execution.

The SES/objectbench family is available on HP-UX, Sun SPARC and IBM AIX workstations. Price of SES/objectbench Frame Builder is \$5,900.

Contact SES, 4301 Westbank Dr., Bldg. A, Austin, TX 78746-6564; (512) 328-5544.

Circle 387 on reader card

Hilco Handler Provides MMS Interface

Hilco Technologies' Dellenian client-server handler architecture supports the ISO MMS command language for Ethernet communications. This capability makes it easier for CIM software running on multiple HP 9000 RISC workstations to communicate with Allen-Bradley PLC-5s equipped with an Ethernet port. The Dellenian handler operates as part of Hilco's MONITROL/UX CIM application enabler software.

The MMS command language provides the protocol needed to send commands such as read/write and upload/download to a PLC-5 over IEEE 802.3 (Ethernet) and 802.4 (MAP).

The MMS handler allows a single workstation, or server, to act as the principal interface to PLCs in a network of multiple PLCs and RISC workstations.

Contact Hilco Technologies Inc., 3300 Rider Trail S., Ste. 300, Earth City, MO 63045; (314) 298-9100.

Circle 385 on reader card

Mitchell Humphrey & Co. Releases FMS II

Mitchell Humphrey & Co. released FMS II, the most recent version of its financial management systems software.

The full-featured, online, real-time family of accounting systems is portable across the HP 3000 and HP 9000 platforms, enabling

Introducing NETWORK PRINTING VIA NLM

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Makers of Reflection Series Software. HP terminal emulation for PCs and Macintoshes. Call (800) 872-2829.

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users to run the software on a proprietary, UNIX or client-server system.

This version was designed with the suite of fully portable business applications built on open systems standards including POSIX, UNIX and SQL. Operating systems are HP-UX, MPE/iX and Microsoft Windows, using the C and C++ programming languages.

A GUI provides standard features such as multitasking, pull-down menus, dialog boxes, a toll bar, drop-down lists, check boxes and a clipboard for copying and transferring information to other GUI applications.

System-wide decision support tools such as inquiry plus, report writer and budgeting can be used to analyze, forecast and manipulate data and integrate with spreadsheet, graphics, word processing and other executive decision support systems.

Contact Mitchell Humphrey & Co., 11720 Borman Dr., Ste. 310, St. Louis, MO 63146-4192; (800) 237-0028.

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CIRCLE 267 ON READER CARD

Orlicon Technology Inc. Offers PrintCommander

Orlicon Technology Inc. announced the release of PrintCommander remote spooled printing software for the HP 3000.

PrintCommander delivers spooled printer output to remote printers, faxes or telex machines. Remote printers can communicate with the system using any type of network connection. Outbound dialing to remote printers is supported when the products is used in conjunction with the Telamon Network Engine.

PrintCommander runs on all versions of MPE and MPE/iX.

Contact Orlicon Technology Inc., 269 Moore Park Ave., N. York, ON M2M 1N5; (416) 250-1688.

Circle 380 on reader card

Z-Code Ships Z-Mail 3.0

Z-Code Software Corp. shipped Z-Mail 3.0, the latest release of their Z-Mail Electronic Mail System. Z-Mail 3.0 features directory services access, MIME support, international support, remote mail capabilities, extensive configuration capabilities, hypertext online help and improved performance.

Z-Mail 3.0 offers new core functions, additions to the scripting language, enhancements to the user interface and fine tuning of performance that facilitates the handling of large volumes of mail.

Z-Mail 3.0 offers directory service access — a user interface to query a local or remote directory server for address information of users within the environment. This allows Z-Mail to be linked into directory service programs already in place, such as Network Information Services (NIS or "Yellow Pages"), localized aliases or password files, proprietary databases and X.500 servers (white pages). If no directory exists, Z-Mail provides the capability to build one.

Contact Z-Code Software, 4340 Redwood Hwy., Ste. B-50, San Rafael, CA 94903; (415) 499-8649.

Circle 379 on reader card

MetaCard Imports HyperCard Stacks

MetaCard Corp. announced an upgrade to their hypermedia and Rapid Application Development environment. MetaCard is an easy-to-use alternative to conventional GUI development environments, hypertext document creation applications and presentation packages.

MetaCard 1.3 also can import and run stacks developed in the Apple/Claris

HyperCard version 1.2.5 and 2.1. HyperCard XCMDs are supported through a HyperCard compatible API, but must be recompiled for each target platform.

Other features include support for object-oriented (vector) graphics, new functions for spawning and managing external processes, playback of FLI/FLC format animation and support for import and display of EPS (PostScript) graphics. MetaCard 1.3 also features a user interface that supports multiple object selection with alignment and grouping.

MetaCard 1.3 will run on HP 9000 Series 300/700, SPARC (SunOS and Solaris 2.x), Sun 3, DECstation and DEC Alpha, SCO Open Desktop, 88open, Silicon Graphics IRIS, UnixWare, Linux and IBM RS/6000.

Single user copies of MetaCard cost \$495. Site licenses are available from \$1,800 for five users up to \$15,000 for 250 users.

Contact MetaCard Corp., 4710 Shoup Pl., Boulder, CO 80303; (303) 447-3936.

Circle 377 on reader card

HARDWARE

Kyocera Corp. Releases FINEDISK FRD-3151 MOD

Kyocera Corp. offered its 3 1/2-inch FINEDISK FRD-3151 MOD media. Kyocera FINEDISKS comply with all ISO standards, can operate on all manufacturers drives and at drive speeds of 1,800 to 3,600 rpm. FINEDISKS offer a preformatted 128 MB capacity protected from dust by an anti-static hardcoat.

Kyocera also offers the FINEDISK FRD-3351 with a P-ROM (Partial ROM) service where customer supplied software can be installed on the disk in a Read Only area. The remainder of the disk can be used for normal rewritable storage.

The FINEDISK FRD-3151 costs \$255 and is available in packages of five disks.

Contact Kyocera Corp., 5713 E. Fourth Plain Blvd., Vancouver, WA 98661; (206) 750-6107.

Circle 371 on reader card

ECCS Inc. Introduces Automated Network Backup

ECCS Inc. announced the Backup Module, a complete backup system which integrates industry-standard 8mm tape storage technology with reliable robotic cassette handling and a comprehensive data management system.

Highlights include: robotic access to 100 GB, providing automated access to ten 8mm cartridges, eliminating the need for operator

intervention during backup; automatic, unattended backup; multiple-client support, which allows all users on the network to be backed up to a single Backup Module; multiple-drive support; complete media management; client-based restore; and a GUI that provides configuration capabilities for the systems administrator and the individual client.

The Backup Module supports Sun SPARC platforms and costs \$19,995. Contact ECCS Inc., One Sheila Dr., Bldg. 6A, Tinton Fall, NJ 07724; (800) 322-7462.

Circle 375 on reader card

Xerox Provides HP Connection

The Xerox Corp. announced and launched The McLean Group Inc.'s L-25X decentralized printer protocol converter for HP 3000 and HP 9000 computers and Xerox 4235 and 4700 laser printers.

The L-25X supports HP-IB commands and structure, and connects directly to the IEEE 488 cable. The L-25X provides HP 256X printer emulation for the Xerox printer. Commands, status inquiries and error recovery procedures are executed to the Xerox printer. HP 3000/9000 console response emulates HP 256X responses. The L-25X converts PCL command strings to use third-party forms-creation and spooling software from Proactive Systems, Unison-Tymblabs and Holland House.

The Xerox 4235 is a monochrome duplex cut-sheet printer at 35 ppm, and the Xerox 4700 is a full-color simplex 30 ppm printer. Both printers provide users with multiple paper handling services in multiple printer languages. The Xerox 4700 supports PCL, Postscript and XDPM with color extensions. Contact The McLean Group, 1700 S. El Camino Real, San Mateo, CA 94402; (415) 299-1100.

Circle 398 on reader card

Analog Line-Card Tester Reduces Development Time

HP announced a POTS test-system option for its telecommunications board-test systems that helps manufacturers of analog-line-cards bring products to market faster. The new tester, HP 3079CT, reduces test-development time from four to six months, to a few days. In addition, it increases production-test throughput by enabling parallel testing of transmission and signalling functions.

The HP 3079CT is available as a systems. It also is available as an upgrade for HP 3070

board test systems. The HP 3079CT provides a full range of transmission, signalling and supervision tests to verify analog- and digital-line-card performance.

For POTS, the HP 3079CT uses an integrated VXI virtual instrument to provide analog-signal analysis. The HP 3079CT also provides testing solutions for ISDN line cards on the same platform.

Price starts at \$85,000 and can be added to any HP 3070 board test system.

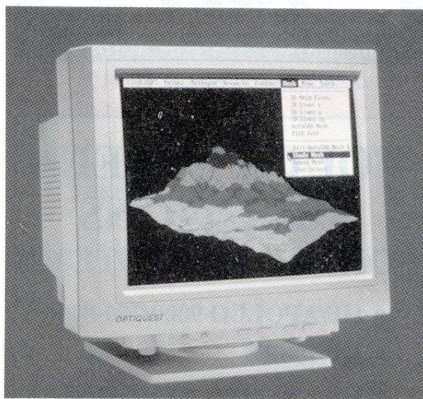
Optiquest Introduces 4000DC 17-Inch Monitor

Optiquest Inc. introduced its 4000DC 17-inch, flat/square, color monitor. It features on-screen programming for control of monitor adjustments and a color matching system.

The 4000DC features an invar shadow mask which increases image crispness and brightness, compared to traditional CRTs. The unit's 17-inch flat/square display features ARAG (anti-reflection, anti-glare) coating designed to reduce distortion and eliminate dust static and attraction.

The 4000DC features an infinite palette of colors, .28 dot pitch and supports all common 15-pin display standards including: UVGA, IBM's 8514/A, SVGA, VGA, with a maximum non-interlaced resolution of 1280 x 1024. The unit also provides a 76 Hz refresh rate up to 1024 x 768. Price is \$999. Contact Optiquest Inc., 20490 E. Business Pkwy., Walnut, CA 91789; (909) 468-3750.

Circle 393 on reader card



The Optiquest 4000DC allows for precise control of monitor adjustments.

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Outsource Of Controversy

Overseas Programming Is Here To Stay. What Are You Going To Do?



By Gordon
McLachlan

If you don't have extra skills and capabilities to make up for the difference in cost, your job could easily move out of the country.

One of the latest trends in MIS outsourcing is the use of foreign body shops to provide programmers. When I worked for one major corporation — over 10 years ago, they would often import Indian programmers through foreign body shops when they needed extra stateside manpower for one job or another.

These people were well-educated, highly-skilled and well versed in the English language. The bottom line was they could get the job done as well as your average American programmer, and more importantly, they were a bargain. To some of us, however, it looked like exploitation.

Despite the appearance of exploitation, it was viewed as an opportunity for these men to make more money than they could have back home. And, an even better opportunity if they wanted to immigrate here and eventually get U.S. citizenship.

The government did eventually catch on to abuses of the visa system, and has tightened up its policies over the last few

years. Now, U.S. companies supposedly have to pay the “prevailing wage” for foreign nationals they hire to work in the United States. But what is the prevailing wage? On the one hand, an entry-level programmer could be paid \$8 per hour to work at the local university, but on the other hand, an experienced professional could pull down \$40 per hour.

However, it seems that a few large companies are now even finding ways around that stumbling block by outsourcing projects to foreign companies that do all the work off-shore. Thanks to the wonders of modern telecommunications, it's now possible to move entire projects to India, Ireland or any other place where you can find cheap labor or government subsidies.

Are U.S. programmers seriously at risk? You bet. Our companies need computers, but they're getting increasingly touchy about how expensive it is to

develop code for those machines. And, things aren't getting any cheaper. If you don't have extra skills and capabilities to make up for the difference in cost, your job could move out of the country as easily as some unlucky factory worker.

Ed Yourdon — the man behind the eponymous development methodologies he pushes — recently wrote in *Computerworld* that the American computer programmer was overpaid and underskilled, and should either develop world class skills in “computer aided software engineering, systems development methodologies, software process maturity, metrics, reuse, software quality techniques and software engineering ... business process re-engineering, system dynamics modeling and software risk management” or be prepared to take it like a man.

What Ed's saying is that if you want a job in the 21st century, you need to develop a repertoire that will elevate you to a Jack-of-all-languages, because the time has past when you are considered to be worth 50 grand to blow out COBOL code.

Ironically, it may be the failure of formal methodologies that saves us. It's a pain to develop code long-distance. A critical part of any development project is the face-to-face time programmers have with their customers and each other. To write code off-shore, you have to be pretty rigorous in your specifications and use formal assignment hand-offs to keep everything under control. I can't see long-distance development being any more satisfying than a long-distance love affair.

John Dvorak opined in his *PC Magazine* column that “While this dream of cheap foreign code may eventually work for large, bloated systems, the best code is still done by small teams of young American coders eating pizza and drinking Coca Cola. And I've yet to see any decent code come out of India.” Well, the bad news, John, is that Coca Cola just re-opened its franchise in India after a 20-some year hiatus. Thank God there is still no decent pizza delivery.

McLachlan's internet address:
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